PRACTICAL OBSERVATIONS

ON THE

OPERATION

FOR

THE STONE.

SECOND EDITION.

WITH

AN APPENDIX,

CONTAINING

A DESCRIPTION OF AN INSTRUMENT CALCULATED TO IMPROVE THAT OPERATION.

BY SIR JAMES EARLE, F. R. S.

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TO

MR. WILLIAM LONG, F. A. S.

AND SURGEON TO ST. BARTHOLOMEW'S HOSPITAL.

DEAR SIR,

I BEG your acceptance of the following Treatise; and give me leave to say that I feel great satisfaction in presenting it to you, as to an old friend, who has long laboured with me in an establishment which reflects the highest credit on its beneficent supporters, and does honour to humanity; as to a perfect judge of the subject of the work, and as a witness of the facts which it contains.

I am,

Dear SIR, with great regard,

Your most obedient humble servant,

JAMES EARLE.

Hanover Square,
Feb. 25, 1793.

PREFACE.

The subsequent observations wholly originated and were written in consequence of a passage inserted by the late ingenious Doctor Austin, in his Treatise on Human Calculi, which had, in the judgment of many professional men, a tendency to create too much alarm in the minds of persons afflicted with a painful disease, and to depress their hopes of relief, by representing the only known means of curing it in an unfavourable light. An endeavour to soften such an impression, so far as a real statement of facts could produce that effect, appeared to me a duty to society. The papers were at the press when the melancholy event of the Doctor's death took place. I now there-

fore

fore feel peculiar ſatisfaction in having ſhewn them to him in manuſcript; and that they received the ſanction of his approbation. Indeed it was his deſign, as he aſſured me, had he printed another edition of his work, to alter the expreſſions to which I have alluded: Such occaſion not having been furniſhed, the obſervations which I have advanced in the following Treatiſe, appear to be more neceſſary, ſince the aſſertions on which it was deſigned to comment cannot be retracted by the authority from which they came, but muſt continue unrepealed to produce their influence, as unfortunately their author is no more.

The loſs of this eminent man muſt be ſeverely felt, and will be long lamented by his family, by his numerous friends, and by the world.—As I conceive that ſome particulars of a life ſo conſpicuouſly uſeful may be gratifying to many who were only perſonally acquainted with him, and perhaps not unin-

tereſting to others, I am induced to embrace the opportunity, which the mention of his name at this time ſeems to offer, of paying a feeble tribute to his memory; and I hope that the call of friendſhip, and the deſire of contributing to preſerve the record of an exemplary character, will be permitted to plead my excuſe if, *in this place*, I take the liberty of inſerting the following narrative,—for the materials of which I have the beſt authority.

Doctor William Auſtin was born at Wotton-Underedge, in Glouceſterſhire, the 28th of December 1754. He was the youngeſt of eight children. His father was a clothier, which trade had been followed by his anceſtors for ſeveral generations: at eight or nine years of age he was ſent to the grammar-ſchool of that town, under the tuition of the Rev. Mr. Cliffold; he continued there until he was about thirteen, and had at that time made a

 conſiderable

considerable progreſs in Latin and Greek. Being deſigned for trade, he was then ſent to a ſchool at Stroud in the ſame county, to learn writing and accounts, where he continued about a year; at the expiration of which time he returned home, and remained with his father about two years, being occaſionally employed in ſuch concerns as might more immediately become the object of his future purſuits. During this time his friends were endeavouring to procure a ſituation for him in the counting-houſe of ſome reputable merchant in London; but that intention being fruſtrated, and the early ſuggeſtions of genius prompting, determined him to return to the grammar-ſchool, and qualify himſelf for the Univerſity. His friends, apprehenſive that this determination might be eventually injurious to his intereſts, recommended to him deliberately to reflect on the ſteps which he was about to

take,

take, but underſtood that his reſolution was maturely and ſteadily formed, and were deſired only to requeſt that he might be placed as forward as poſſible by his maſter, in order to have an opportunity of regaining the time which he repreſented himſelf to have loſt. But no time really ſeemed to have been miſapplied, for even while he continued with his father he had amuſed himſelf with reading many Latin and Greek authors; ſo that when he returned to ſchool, Mr. Cliffold, who expected, as his purſuits had been different, that he muſt of courſe have forgotten much of what he had previouſly learned from him, was much ſurpriſed to find that he was greatly improved, being able to read Thucydides, and other difficult authors. From ſuch rapid improvement one might have ſuppoſed him almoſt to have been abſorbed in ſtudy, yet we find him not only fond of reading, but at this

time

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time enjoying ſociety and every juvenile amuſement: from an early age he excelled in every ſportive game, and from an eagerneſs, which accompanied all his future purſuits, often ſlept in his clothes, to ſave the time of dreſſing, that he might be more ready to reſume his play. Though apparently not of a robuſt make, he was naturally very muſcular, ſtrong, and remarkably active; at a more advanced period he frequently walked from London to Oxford, above fifty miles in one day, and from Wotton-Underedge to Oxford, about an equal diſtance, in the ſame time, and returned in the ſame way. Once going from Oxford, and endeavouring, as the road was dirty, to find his way over the fields, he was benighted within ten miles of his father's houſe, when hearing ſome people dancing in a barn, he joined in the dance, and got home early the next morning, appearing not in the leaſt tired. He uſed to

ſay

ſay that after he had walked 28 or 30 miles, the journey ceaſed to be pleaſant, though not very fatiguing.

I cannot forbear relating another circumſtance of little moment, but as it ſerves to pourtray his activity and perſeverance. Being at the houſe of a friend one evening, where they were regretting, as the weather was fine, that they could not procure a man to cut down about an acre of heavy graſs, he ſuddenly exclaimed, I'll do it.—They ſmiled at his manner and deſign, thinking it far beyond his ſtrength and ability, when he again ſaid, I will do it to-morrow.—He began accordingly early in the morning, and got through it very well in one day—a very ſufficient taſk for a perſon in the habit of mowing.

Great bodily exerciſe he always thought neceſſary for his health. Indeed he ſcarcely had

ſuffered the illneſs of a day until he was ſettled in London, where the almoſt conſtant confinement to a carriage tended to undermine his ſtrength and conſtitution.—Caveant Medici! a profeſſional chariot often contributes more to the health of others than to that of its owner.

He was admitted a Commoner of Wadham College, Feb. 20, 1775. As his own inclination alone had led him to the Univerſity, and as he knew that he could receive but little aſſiſtance from his father, he determined to qualify himſelf for any thing which might poſſibly be obtained in College. Thinking himſelf ſtill deficient in the Greek language, he exerted his utmoſt application to attain an exact knowledge of it. And, ſome time afterwards finding there was an exhibition for a ſtudent in Hebrew, he determined to learn that language. As it was near the vacation, his tutor recommended to him to ſtay in college

lege and apply closely to it; but not choosing that confinement, he went to visit his friends. On his return to college, his tutor rather upbraiding him with the loss of time, as the exhibition was soon to be filled up, the Doctor assured him that he had studied Hebrew—and was ready to submit to an examination.—It appeared that he had spent his vacation with the most industrious attention to the subject.—He became a candidate for the exhibition, and obtained it. He was elected a scholar of Wadham in 1773.

When he went to the University it was his original intention to take orders, a profession in which he might gratify his taste for a college-life. And it is probable that he took some pains to qualify himself for the church, from the facility with which he afterwards wrote sermons for several of his young clerical friends, many of which, some in print and some in manuscript,

ſcript, are in conſiderable eſtimation. Dr. Auſtin lately informed a friend of mine, that he thought himſelf highly honoured, on being told laſt winter by a dignitary of the church, of diſtinguiſhed abilities, that he had juſt preached a ſermon of the Doctor's compoſition. As other proſpects opened equally favourable to his wiſhes, he relinquiſhed his firſt deſign, and ſoon afterwards declared a determination not to take orders, though he did not appear at that time to have decided in favour of any other profeſſion. He ſhewed a diſpoſition to practiſe either phyſic or law, but ſeems not to have made his election between the two till he had obtained a botanical exhibition, which having a connection with medicine, probably determined him in the choice, from which he never afterwards deviated.—November 9, 1776, he took his degree of Bachelor of Arts, and ſoon after-

wards

wards became assistant-tutor to the celebrated Dr. White, the Laudian Professor of Arabic, and on the professor's declining to take pupils gave lectures on his own account.

Hitherto his literary pursuits had been various and equally applied to the elegant and profound parts of science. The study of medicine now began to predominate; and in order to improve his knowledge in that science, by the most extensive means of practical observation, in 1779 he came to London, and entered as a pupil at St. Bartholomew's Hospital. During his residence in the metropolis he paid the strictest attention to the study of diseases, to anatomy, and to every species of information which could adorn the philosopher, or accomplish the physician. To mark his assiduity and general thirst after knowledge, it may be mentioned that he regularly attended Mr. Pott's chirurgical lectures, though upon

subjects

ſubjects not abſolutely neceſſary in the line of practice which he intended to purſue. Poſſibly he might agree with what Mr. Pott often remarked, "that both branches of medicine are ſo connected together that they are not to be ſeparated without doing great injury to both, and that to underſtand the theory of ſurgery would be ſomething more than a feather in the cap of a regular phyſician."—His character did not eſcape the obſervation of ſo experienced a judge of men and manners as Mr. Pott, who often obſerved to me, "I ſhall not live long enough, but you will ſee Auſtin at the head of his profeſſion."

After he had thus diligently purſued his ſtudies for a time in London, he returned to Oxford, when relying on his own induſtry, he generouſly relinquiſhed the whole of his patrimony, which was ſmall, for the benefit of his ſiſters, and on the ſole but ſolid baſis of his

abilities,

abilities, commenced faber fortunæ ſuæ. In Act Term 1780, he took the degree of Maſter of Arts; and in the following year he publiſhed an examination of the firſt ſix books of Euclid's Elements. The ſtudy of the mathematics had always great attractions for him, and, it is probable, had he poſſeſſed an independent fortune, he would have applied more cloſely to it: about this time he gave public lectures in that ſcience in the abſence of the Savilian Profeſſor of Geometry, which he alſo continued to do after he had begun to practiſe as a phyſician. He was admitted to the degree of Bachelor of Phyſic in Lent Term 1782, and to that of Doctor in the Lent Term of the following year. He was enabled to take this degree ſo ſoon after the former in conſequence of a ſtatute made in the latter end of the year 1781, by which the time required for medical degrees was greatly ſhortened.

In 1782, he married Elizabeth daughter of

John Dupre, Eſq. She died in 1784, and left one ſon, who ſurvived her but a few days.

In 1784, though variouſly engaged, not finding his time completely occupied, it was his intention to give a courſe of Lectures on Phyſiology to the medical ſtudents of the Univerſity, and he applied himſelf with his uſual alacrity and vigour of mind in collecting and arranging materials for this purpoſe; but before he had perfected his plan the Profeſſorſhip of Chemiſtry became vacant, and to that office he was appointed in 1785. At this time his character ſtood very high in the Univerſity; and though the ſcience of chemiſtry was in a manner new to him, yet great things were expected from a man of his acknowledged abilities and indefatigable application, ſo that when he began his courſe he was attended by a very numerous and reſpectable audience. It is but juſtice to ſay that he acquitted himſelf with

with great credit, to the satisfaction of the University, to the advantage of the pupils; and to the improvement of the science itself.

In 1786, he married Miss Margaret Alanson, his present widow, by whom he had four children.

Though the study of chemistry occupied a considerable part of his time, the principal point which he had in view was the practice of physic, and to this all his other studies happily tended: but above all, the accurate acquaintance with the animal œconomy which he had gained during his physiological pursuits, contributed to that clear discrimination of diseases, and that quick perception of the various deviations from the natural functions which in his future practice he uniformly evinced. His industry and abilities procured him employment in his professional capacity at an early age; and he continued to practise at Oxford with great and increasing reputation until

 1786,

1786, when, being invited by the general voice of the governors to accept the office of physician to St. Bartholomew's Hoſpital, he came to London.

His conduct in his new ſituation accorded with the general tenour of his life. Humane and aſſiduous care of the patients, the moſt polite attention to the inſtruction of the ſtudents, and an ardent curioſity to ſee and inveſtigate every uncommon occurrence which could either throw new light on any diſeaſe, or enlarge his own ſphere of knowledge, marked his progreſs.

His time was not yet ſo much employed as to prevent him from giving up a portion of it to his favourite purſuit of chemiſtry. Like his great predeceſſor Boerhaave, he found amuſement for his leiſure hours in making chemical experiments, of ſome of which he has left an account, particularly of his experiments on the formation of volatile alkali, and

of the affinities of the phlogisticated and light inflammable airs. A memoir on this subject he presented to the Royal Society in 1787, and another paper containing his experiments on heavy inflammable air, in 1789, both of which were inserted in the philosophical transactions.

Soon after he became physician to St. Bartholomew's Hospital, he instituted a course of lectures on chemistry, and on the theory and practice of physic, for the benefit of the pupils; which he afterwards gave in a convenient building provided for him by the liberality of the governors of that charity.

His last experiments on chemistry were principally employed in analyzing and investigating the nature of concretions formed in animal bodies, particularly those which are found in the urinary bladder. In the prosecution of this, he employed much time, often taken from the natural hours of repose, and he bestowed uncommon pains on the subject

with

with a view to find ſome internal means of relieving mankind from ſo cruel a malady. The reſult of theſe enquiries made the ſubject of his Gulſtonian lectures which he read at the College of Phyſicians in 1791, and were afterwards formed by him into a treatiſe.

The qualifications natural and acquired, which Doctor Auſtin poſſeſſed, could not fail of attracting the notice and commanding the reſpect of the world. His comprehenſive knowledge, his patient attention, acute diſcernment, and extraordinary activity, ſoon led him into an extenſive circle of profeſſional employment, while an engaging mildneſs of manners made all his patients his friends.

His reputation, rapidly increaſing, found in this great city and its environs ample room for its expanſion. In 1790 his time became ſo much occupied, that he was obliged reluctantly to relinquiſh his lectures at the hoſpital: this however he did with the leſs regret, from

a certainty

a certainty of their being ably continued by his much valued and learned friend Dr. Latham. On the further increaſe of buſineſs, finding that the multiplicity of his engagements would not permit him conſcientiouſly to attend to his duty at the hoſpital, he determined to reſign it, and had actually given notice of his reſignation before his laſt illneſs.

If the ſhortneſs of the time in which Dr. Auſtin exerciſed his profeſſion in London be conſidered with the extent of his practice, the rapidity of his progreſs has perhaps been unparalleled, certainly not exceeded. Had it happily been more moderate, or, while engaged in preſerving the lives of others, had he not been inattentive to his own, we ſhould not, in all human probability, now deplore the loſs of him, but like a Heberden, or a Cadogan, he might have long continued an ornament to his country, and a bleſſing to mankind.—It appears that exceſſive attention

to the duties of his profeſſion, too ſhort a time allowed for the neceſſary refreſhment of ſleep, and too little regard to the actual ſtate of his health, brought on the fever which put a period to his diſtinguiſhed life, at the premature age of thirty-eight, on the 21ſt of January, 1793.

PRACTICAL OBSERVATIONS

ON THE

OPERATION FOR THE STONE.

THE particles of matter which form the animal fluids quitting the mode of combination in which they usually exist, may undergo a new arrangement, and form masses of considerable solidity. While the fluids are, in the course of circulation, agitated by constant motion, and endued with the principle of life, any disunion of their elements seems scarcely possible; but the secreted fluids which stagnate in the excretory ducts, or reservoirs

belonging to glands, and which in consequence of such stagnation may probably be deprived of a portion of their vitality, are more subject to chemical decomposition. Under such circumstances, and in such situations, these solid concretions are most frequently formed. They are found in the lachrymal sac, the ducts of the sublingual glands, the gall bladder, the kidneys, ureters, urinary bladder, and urethra; and, though not so hard nor so heavy as those commonly produced in the earth, have, from superficial observation, been usually denominated stones.

Concretions of various kinds are formed in many other parts of the body; they are sometimes thrown out on the surface of membranes, as on the pleura; they are sometimes collected in the ramifications of the bronchial vessels of the lungs, whence they have been discharged by coughing. Incrustations have been found under the pre-

puce of infants, and in the joints of gouty people matter reſembling chalk is often abundant. The brain is not exempt from ſubſtances of this nature, the pineal gland frequently containing ſabulous matter, and in one inſtance, probably not the only one, the gland was converted into a mere cyſt filled with ſand.

When ſtones are formed in parts without motion, they ſometimes cauſe no pain nor inconvenience. In the ducts of the ſublingual glands there have been inſtances of their increaſe to a large ſize, without producing ſufficient ſenſation to be noticed till they have burſt their way through the integuments, and they are ſometimes met with in tumours and abſceſſes where there had been no ſuſpicion of them. In the caſe of the hernia of the urinary bladder, mentioned by Mr. Pott, which included a ſtone, the portion of the bladder which contained it, being without

 motion,

motion, ſuffered no pain; the perſon felt no ſymptom of the ſtone, and was only conſcious of a lump or ſwelling in the groin. Yet it is alſo certain that they often give great pain by the diſtenſion of the ſenſible parts which contain them, particularly in the kidneys and gall-bladder.

As the urinary bladder is the moſt capacious cavity in the body, where the greateſt quantity of fluid is gradually collected, and long retained, it muſt follow that it is more liable, than any other part, to this diſeaſe; indeed the urine in this ſituation ſeems ſo much concerned in the formation of theſe concretes, that any foreign body, of whatever kind, which accidentally may be depoſited in it, will there infallibly attract and collect ſolid particles, even in perſons who are not conſtitutionally ſubject to the ſtone, nor have ever been affected with any diſeaſe of the bladder. When ſtones are formed in the cavity of this organ, the motions

tions and contractions to which it is subject, cause them to produce the most exquisitely painful sensations.

The stone in the urinary bladder will be the object of our present consideration, being one of the most severe diseases which afflict the human frame, and demanding, in a peculiar manner, the assistance of surgery. It is a disease to which both sexes and all ages are liable; stones are often found in the bladders of very young children *; sometimes they do not begin to accrete till a more advanced age; in other persons no symptom of them is perceived till the inactive decline of life.

When, from whatever cause, a nucleus or centre of attraction is once formed in the bladder, the solid matter which is attracted and takes place round it, is deposited in la-

* I have lately seen an infant who, when six months old, and at the breast, which was its only nourishment, voided with pain large quantities of gravel.

 minæ

minæ of different thicknesses. Some stones are of a reddish brown colour, others are ash-coloured, others white, and some of a dark colour resembling iron ore; these last mentioned are very uncommon. Some stones are close, compact, and hard; others are of a texture soft as chalk. Sometimes the different laminæ, in the same stone, differ from each other in texture, colour, and consistence. It has been remarked that soft stones grow faster than hard, and are often angular; hard ones are usually oblong or oval, very seldom round. Hard stones, with a smooth surface, sometimes do not excite great pain; when angular or rough, the contractions of the bladder on them cause exquisite pain and irritation, particularly on the expulsion of the last drops of urine. Small stones of this description falling into and lodging in the neck of the bladder, are more painful than when they are grown so large as to continue in the

cavity

cavity of the bladder, where the preſſure on them is not ſo violent.

Women are leſs ſubject to this complaint than men; whether their conſtitutions are leſs liable to calculous depoſitions remains to be proved, but whenever they are collected in the female bladder, they are much more likely to be evacuated than in men, becauſe, in them, the neck of the bladder, not being ſurrounded and embraced by the proſtate gland, and the canal of the urethra being ſtraiter, ſhorter, and more eaſily admitting conſiderable dilatation, a ſtone will readily paſs through of ſuch ſize as could not be diſcharged by the male urethra. So that in females it is rare to meet with a ſtone in the bladder.

In children the ſtone ſeems generally to be formed in the bladder, as they ſeldom complain of pain in the kidnies, but in adults it frequently originates in the kidnies, and from thence is waſhed by the urine into the blad-

der. This can ſcarcely be effected without the perſon feeling pain, and a conſciouſneſs of having paſſed a ſtone; in which caſe he ſhould drink plenteouſly of diluting liquors, and retain his urine till the bladder is ſo diſtended as to create a great deſire to evacuate it; he ſhould then place himſelf on his knees, bend his body forward, and make water in that ſituation, the little ſtone by its weight will fall into the neck of the bladder, and very probably may be carried away with the urine copiouſly ruſhing out. I am perſuaded if perſons ſubject to calculous concretions were attentive to ſuch directions, we ſhould ſee fewer caſes of ſtones in the bladder. In either ſex if the firſt depoſite be not ſpeedily removed, it forms, as was obſerved, a center of attraction to ſimilar particles, becomes too large to paſs through the urethra, and, ſooner or latter, according to the nature of the ſtone, acquires conſiderable magnitude.

The

The calculi of the human bladder have lately been investigated by a physician of great eminence, and of distinguished knowledge in the science of chemistry. A treatise which he has published contains many ingenious experiments on the cause and formation of stones. It is much to be wished that these enquiries may be prosecuted, and that a more general attention may be excited to a subject hitherto too much neglected. The gaining a true knowledge of the cause is the first rational step toward the cure of diseases; such investigations therefore are most likely to effect a discovery of the long-sought solvent of the stone, or of the prevention of its growth. At present, as it is observed in the treatise before mentioned, "the art of dissolving the "stone, in such manner as to assist those who "linger under it, is yet imperfect."

Till so valuable a disclosure of the powers of nature is produced, the operation of Lithotomy

tomy appears to be the only means by which the wretched sufferers can procure effectual relief. This, at the close of the same work, is acknowledged; but is accompanied with the following observations. " In the present " state of medicine, those who suffer this spe- " cies of disorder, must either bear it for life, " or submit to an operation which few sur- " geons ever acquire the art of performing " dexterously, and which, performed even " by the most skilful, is by far the most dan- " gerous of any that is practised in surgery."

To cure with the least possible pain or inconvenience humanity points to as the great object of every branch of the medical art. The first study of the surgeon should be to prevent, by all safe means, the necessity of operations, as it is his duty properly to qualify himself for the performance of them, when indispensable. It must be admitted that there are few so difficult as Lithotomy, and that,

that, unscientifically executed, it may be very dangerous, but I trust there are many of our profession capable of " performing it " dexterously." And when skilfully performed, the almost certain success attending it is the best proof that it is not so dangerous as the author has represented it to be. This I shall endeavour to demonstrate in the sequel of these observations.

I am too well acquainted with the humane motives which influence my learned and ingenious friend to think any apology wanting for the freedom I have used with his opinions, but I must observe, that the respect which the world very justly pays to his abilities, giving proportionate weight to what falls from his pen, has made it absolutely necessary to take notice of so discouraging an assertion. And I am confident, that if I am able to substantiate what I have advanced, he will be happy to find that he has been mistaken, and that mankind

mankind ftand a better chance of being fafely relieved from this painful difeafe than he has imagined.

Conceiving it important that the operation of lithotomy fhould be fhewn in its proper point of view, I have been led to reflect on the modus operandi, and on the probable caufes which promote or prevent its fuccefs. Thefe reflections have induced me to undertake to give fome account of the operation itfelf, to defcribe what appears to me to be the beft method of performing it, and to point out fuch circumftances as are materially conducive to its happy termination. I am well aware that this fubject has been already confidered by feveral writers with great precifion and judgment, and I have not the confidence to imagine that I can greatly improve on their defcriptions; yet, he muft be a very inattentive obferver, who, after having feen much of practice, cannot add fome-

thing

thing to the ſtock of general experience. On conſidering what has been premiſed by others, I am inclined to think that ſome principles concerning it may be brought forward, which perhaps have not been ſufficiently enforced, attended with ſome incidental occurrences, which, though apparently minute, are very eſſential to the ſafe performance of it.

The principal obſervations which I ſhall make will, in a great degree, be applicable to every operation of lithotomy, and the whole will be compriſed within a ſmall compaſs, as I do not think it neceſſary to enter into a detail of all the different methods which have been employed, nor into a deſcription of the ingenious inſtruments contrived for their completion; but, leaving them to their reſpective inventors and patrons, ſhall chiefly confine myſelf to thoſe inſtruments which I have invariably uſed, and to that method which I have employed

with ſuch ſucceſs, as warrants my ſuppoſing it at leaſt equal to any other. However, before we enter into the conſideration of it, ſome account of the indications which lead to a ſuſpicion of the exiſtence of the diſeaſe will be properly preparative.

Writers on the ſubject of ſtone in the bladder have frequently laid down certain ſymptoms as unequivocal indications of the complaint, but they are not preciſely ſo, as they cannot be diſtinctly or determinately defined. The principal ſymptoms which they mention are—great pain in voiding the urine—difficulty of retaining it, and frequently of preventing the fæces from being diſcharged at the ſame time.—When the urine flowing pleno rivo, is ſtopped at once, but on changing the poſture, flows again.—A dull pain about the neck of the bladder, frequently accompanied with an acute pain in the glans penis.—A ſenſe of weight or preſſure on the

empty rectum, or after a ſtool, when, uſually, it is at eaſe.—A large quantity of mucus mixed with the urine, and ſometimes tinged with blood.—

Such ſymptoms, at different times, certainly accompany a ſtone in the bladder; but they may alſo be produced by other diſeaſes to which the bladder and its appendages are ſubject. If we conſider the connexions of the neck of the bladder, we ſhall ſee that an affection of any of the neighbouring parts muſt produce the ſame effects. Pain in making water, and not being able to diſcharge the urine without the fæces, are common conſequences of irritation of the parts about the neck of the bladder, from a diſeaſed proſtate gland, and from other cauſes. The urine ſtopping in full ſtream is frequently cauſed by a ſtone altering its ſituation ſo as to obſtruct the paſſage; but the ſame thing may happen from a tumour or fungus in the bladder.

der. I have ſeen an inſtance of this where a tumour hanging by a ſmall pedicle would ſometimes cauſe obſtruction, and by altering the poſture, would retire and give a free paſſage.—The dull pain at the neck of the bladder, and the ſenſation of preſſure on the rectum are frequently owing to the weight of a ſtone being greater than that of the fluid which they are naturally appointed to bear, but theſe may proceed from a diſeaſed enlargement of the proſtate gland.—Children generally, and grown perſons frequently, are ſubject to a prolapſus ani from the irritation of a ſtone in the bladder, but it will likewiſe be produced by any irritation in thoſe parts; a cancer or painful fungus in the rectum will bring it on.—A large ſecretion of mucus, it is true, is a frequent attendant on calculous complaints, and is produced by the irritation of the ſtone on the tender coat of the bladder: it is intended by nature as a preſervative, and

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were there no such secretion, the bladder would have no defence against the ſtone, nor would any one be able to ſupport the contact; however this appearance is by no means a certain indication of the exiſtence of a ſtone, as it may be produced by any cauſe capable of generating the other ſymptoms. Beſides the irritating cauſes which have been mentioned as augmentative of mucus, a defluxion on the hæmorrhoidal veſſels will ſometimes have the ſame effect. And I have known a patient afflicted with this and other ſymptoms of the ſtone, which after death appeared to have ariſen from no other cauſe than a ſchirrous enlargement of the os tincæ. Even thoſe who have any diſtemper in the kidneys will appear to have a ſtone in the bladder, and will be ſubject to the ſame pain, irritation, and ſecretion. I remember particularly the caſe of a lady, who laboured under continual pain, and diſcharged a quantity of offenſive

mucus in her urine; it was concluded by her physicians that ſhe had a ſtone in the bladder; on being ſearched, none was found. It was then thought to be owing to ulcerations of the bladder, as her ſymptoms exactly imitated a diſeaſe of that viſcus, and for this ſhe took a variety of medicines. She was with child, and, ſoon after ſhe was brought to bed, ſhe died. On examination the bladder was found perfect in every reſpect, but both kidneys were much diſeaſed, and one contained a large ragged ſtone. This probably had furniſhed the large diſcharge of mucus, and by the connexion of parts, had produced the pain which ſhe deſcribed to be in the bladder. So equivocal are what have been called ſymptoms of the ſtone, and from ſuch various cauſes do they ariſe.

The leaſt fallible ſign, which I have remarked, of a ſtone in the bladder, is the patient making the firſt portion of urine with

eaſe,

ease, and complaining of great pain coming on when the last drops are expelled. This may readily be accounted for from the bladder being at first defended from contact with the stone by the urine, and at last being pressed naked against it. But to put the matter out of all doubt, and actually to prove the existence of a stone in the bladder, we must have recourse to the operation of sounding.

In order to make this treatise, what I hope it may prove, really useful, it is my intention to go minutely through every part of the operation of lithotomy; in doing this, I may seem to dwell on some circumstances which may not to every one appear of sufficient consequence to be noticed; but, as I shall mention only what I know to be material, I would rather, on a subject of such importance, incur the charge of prolixity, than omit any incident, which may conduce to success.

A perfect and just knowledge of the parts

 concerned,

concerned, is neceſſary to the right performance of every operation in ſurgery; in lithotomy it is peculiarly requiſite, where the hand cannot be guided by the eye, but muſt be wholly directed by anatomical knowledge. The firſt objects therefore which the lithotomiſt ſhould attend to, are the ſtructure of the urethra and bladder, and their true diſpoſition with regard to the adjacent parts; ſome account of theſe it will not be unuſeful to premiſe.

Anatomy is beſt learned by ocular inveſtigation, and is ſo completely taught in the ſeveral ſchools of this metropolis, that I ſhould not think it neceſſary to enter on the ſubject in this place, but with the idea that a deſcription of the parts concerned may ſerve to refreſh the memory of any one about to perform the operation, and to render more intelligible my account of it. In this I ſhall not attempt the minute demonſtration of an anatomiſt,

tomiſt, meaning only to point out the principal circumſtances which require the attention of the ſurgeon.

The operator ought not only to be acquainted with the ſituation of the parts as they are uſually expoſed and demonſtrated in diſſections, but he ought to apply particular attention to their relative ſituation when the pelvis is placed in the uſual poſition during the performance of lithotomy, and to the ſucceſſive order in which thoſe parts are expoſed and divided by his inſtruments.

In order to impreſs theſe circumſtances more forcibly on his mind, I would recommend him, previouſly to the operation, to aſcertain on the pelvis of the patient the ſituation of the arch of the pubes, and then to trace the diverging rami of that bone, and of the iſchia, to their tuberoſities, for theſe bony boundaries are the parts from which his future obſervations muſt be taken.

The raphé of the perinæum divides the ſpace between theſe bones into two equal parts. Immediately beneath the raphé, and before the arch of the pubes, is ſituated the urethra, which at that part being ſurrounded by a larger quantity of cavernous ſubſtance forms its bulb, ſome portion of this ſubſtance being detached from the canal of the urethra, hangs ſlightly pendulous *before the arch of the pubes.* The membranous part of the canal is a continuation of the urethra from the bulb to the entrance of the proſtate gland. It is in length about three quarters of an inch, and paſſes *beneath the arch of the pubes* unſurrounded by any thing but cellular ſubſtance. The membranous part of the urethra is not however in contact with the bone, but lies about three quarters of an inch beneath the arch, being connected to it by intervening cellular ſubſtance.

The proſtate gland which ſurrounds the urethra,

urethra, as it emerges from the bladder, is ſituated *immediately behind the arch of the pubes.*

The urethra thus variouſly ſurrounded, forms a ſegment of a circle which is exhibited by the ordinary curvature of the ſtaff. The whole canal is furniſhed with mucus from many ſmall glands, and as the orifices open outward, there is greater reſiſtance to any thing paſſing from without inward, than from within outward.

The bladder is, ſpeaking in general terms, compoſed of an internal membranous coat, covered by muſcular fibres. The peritonæum is ſpread over the ſuperior and poſterior part of the bladder, but its anterior and inferior part is without this covering. The figure of the human bladder is not pyriform like that of brutes, but is of equal dimenſions at both extremities. A line drawn from the fundus in its longeſt axis, will not paſs through the

 neck,

neck, but through the middle of its inferior part, and will go out of the pelvis between the tuberofities of the ifchia, nearly at the extremity of the os coccygis.

The termination of the rectum is at a fmall diftance from the membranous part of the urethra. When the rectum is *undiftended*, it proceeds, for fome way in the pelvis, in a fituation rather inferior to the anus, therefore fufficiently remote from the probability of receiving injury in the operation.

I have thus given an outline of the principal parts concerned. They lie imbedded in a large quantity of cellular and adipofe fubftance, and are covered by ftrata of mufcles and integuments. The extremity of the rectum is enclofed by an elliptical fphincter. The bulb and cavernous fubftance of the urethra, by the acceleratores urinæ. As neither of thefe demand particular chirurgical attention, they do not in this place require defcription.

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The tranſverſi perinæi deſerve more particular notice, as they muſt neceſſarily be divided in the operation. Theſe muſcles ariſe from the tuberoſities of either iſchium, and extend tranſverſely acroſs the perinæum, partly mixing with the acceleratores urinæ, partly with the ſphincter ani, and partly terminating in an obſcure and undeſcribable manner between the bulb of the urethra and extremity of the rectum.

Paſſing the ſound even in a healthy ſubject, is an operation which requires both dexterity and delicacy; but if we conſider that in perſons afflicted with the ſtone the parts are frequently inflamed, painful, and diſeaſed, it becomes infinitely more difficult, and demands the utmoſt degree of patience and care, it may otherwiſe produce great preſent pain and much future inconvenience. The inſtrument which is uſually employed is ſolid and made of ſteel; the figure of it differs with regard to

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the greater or ſmaller convexity of the curve. In the operation of lithotomy it may be right to have the ſtaff made with conſiderable convexity, that it may be more eaſily felt and cut upon; but for the mere purpoſe of ſearching, one with a ſmaller convexity, or more inclining to a ſtrait line, will paſs more readily and anſwer better. The catheter has been ſaid to ſerve the purpoſe of ſearching as well as the ſound, and though the touch of the iron inſtrument, when in contact with the ſtone, is more clear and preciſe than the hollow ſilver, I am inclined to think the catheter is in ſome reſpects preferable; if the bladder contains water, the entrance of the catheter is clearly ſhown by the water coming through the canula, and as it flows away the bladder contracts and brings the ſtone into contact with the inſtrument, for which reaſon it is better for the patient to retain his urine before he is ſearched. If the

bladder

bladder has been recently emptied, a ſmall ſtone may lie in the folds ſo as not to be readily felt, and may make the operation, which in itſelf to moſt people is irkſome and painful, more tedious than it needs to be. If the patient could bear to have the inſtrument introduced ſtanding, it would be an advantageous poſition, or, ſuppoſing it paſſed in the uſual way, as half-ſitting half-lying, he reſts on the os ſacrum, he may afterward be made to ſit up while the water is flowing, and the ſtone by its gravity will fall toward the neck of the bladder, and come into contact with the catheter.

Whether a ſound or catheter be uſed, it ſhould be proportioned to the ſize of the patient, and the thickneſs ſhould be determined by the diameter of the urethra. In general, an inſtrument of rather large ſize paſſes better and ſafer than a ſmall one, as it ſtretches the urethra before it, and makes a little ſpace for

its own paſſage, whereas a ſmall one is more apt to hitch in the folds of the membrane which lines the urethra.

The inſtrument, being well oiled, may be introduced in men with the handle toward the belly, in which caſe it is only neceſſary to purſue the courſe of the urethra with the point of it. The uſual and moſt convenient way is to introduce it with the handle toward the knees, till it reaches the part of the urethra where it begins to make a curve in order to paſs under the oſſa pubis; the handle is then to be gently turned and to be brought up to the center of the abdomen, care being taken not to loſe any ground with the point. The beſt method to make the inſtrument paſs, is to take care that the hand which has the inſtrument, and that which holds the penis, act in concert, the left hand ſtretching the urethra and rather drawing that over the inſtrument, than forcing on the inſtrument itſelf; by theſe

means it will usually pass with ease till it arrives in the membranous part of the urethra, and near to the neck of the bladder. At this part, from the pressure of the prostate gland, which is often enlarged by inflammation, caused by irritation from the stone; or possibly sometimes by the instrument carrying the membrane which lines the urethra before it, and behind the prostate, the completion of its introduction into the bladder is obstructed. When such a hindrance or impediment occurs, it requires great delicacy and management. If the instrument be pressed on it is very liable, particularly in a young subject, to make its way through the membranous part of the urethra, which is the thinnest and weakest part of the canal; and thus a false route may be established—a circumstance very injurious in itself, and likely to lead to the most dangerous consequences in case of a subsequent operation for the stone, as the staff

would

would moſt probably enter the new made paſ-ſage, and the gorget neceſſarily following the direction of the ſtaff would not be conducted into the bladder. This circumſtance, I fear, has too often happened, and led to a fatal error. I once ſearched a boy, on whom the ſtaff paſſed with the greateſt eaſe, and found a ſtone in the bladder; it was determined for him to undergo the operation of lithotomy, and the day was fixed when I was to perform it; in the mean time he was ſearched by another perſon, who, as the boy ſaid, had given him great pain, and ſome blood had followed when the inſtrument was taken out. On introducing the ſtaff in order to perform the operation, it paſſed with tolerable eaſe, but when it was far enough to have reached into the bladder, I was ſurpriſed at not feeling the ſtone bare, as before, and the end of the ſtaff did not ſeem to move freely, or be at liberty as if in an open cavity. On exa-

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mining per anum, I immediately diſcovered that the point of the ſtaff had made its way through the membranous part of the urethra, and lay between the bladder and the rectum, and I was well convinced that it had followed a falſe route, which had been made by the ſecond ſearching. I immediately withdrew the point of the inſtrument from the wrong paſſage, raiſed it and paſſed it into the bladder, where I directly found the ſtone, finiſhed the operation, and the boy did extremely well, without a bad ſymptom. It is very poſſible that this accident might have been overlooked, and the wrong poſition of the ſtaff not attended to, particularly as the weight of the ſtone made it palpably to be felt by the ſtaff, though the coats of the bladder intervened, ſo that the want of naked contact was almoſt the only circumſtance which pointed out the error, which, without a timely diſcovery, muſt have moſt probably led to the great de-

triment, if not deſtruction, of the patient; and I wiſh I could ſay that this has been the only inſtance in which I have found a falſe route made by the awkward introduction of a ſound or catheter.

If a difficulty or obſtruction to the entrance of the inſtrument, when arrived at the neck of the bladder, ſhould occur, as before obſerved, it ſhould not be preſſed on, but the point of the inſtrument being raiſed at the ſame time that it is a little withdrawn, it will generally find an eaſy way into the bladder. Or if it ſtill does not paſs readily, the finger introduced into the rectum to raiſe the end of the ſtaff will generally give it the right direction.

In women the female catheter is more eaſily paſſed, as in them the urethra being nearly ſtrait, it need be only introduced into the meatus urinarius, and paſſed gently on.

It is generally with much difficulty that

permiſſion

permiſſion is gained to ſearch infants from the dread which parents have of it, and even grown up people diſlike to be told diſagreeable truths; for which reaſon, when the inſtrument is once introduced, we ſhould not be in a hurry to withdraw it, but ſhould take time enough to be thoroughly ſatisfied, which can only be done by moving the inſtrument in every direction. Sometimes, after having tried a conſiderable time, the ſtone will be perceived on withdrawing the ſtaff; this happens when it is ſmall and lies toward the os pubis. If the ſtone be large it will generally be felt immediately, and will give the ſenſation of a heavy ſteady reſiſtance; if ſmall, it will often elude our ſearch for ſome time, and when felt will recede and give way; however, it cannot be ſuppoſed that the blind touch of an inſtrument, ſurrounded and embraced by the urethra and neck of the bladder, will always point out theſe circum-

 ſtances

ſtances with preciſion: on the contrary, we may often be deceived not only as to the ſhape and ſize of the ſtone, but it is ſometimes difficult to determine whether what we feel be a ſtony concretion or not. The inſtrument paſſing over the rugæ of the bladder, particularly if covered with ſabulous matter, will ſometimes give a deceptive touch of a ſoft ſtone. I have known a caſe, in which too long a ſtaff being uſed and preſſed againſt the os pubis, gave the ſurgeon the idea of feeling a ſtone, when a ſhorter inſtrument being ſubſtituted, diſcovered the miſtake. And I have heard of an operation being actually performed for a ſtone in the bladder, which, after death, proved to be an uncommon and diſeaſed projection of the os ſacrum, which preſſed forward into the bladder, and gave to the ſtaff the feel of a ſtone; but I ſhall ever conſider theſe as groſs inſtances of too precipitate a determination, having no doubt but that great

attention

attention and repeated fearching would have difcovered the miftakes; for it fhould be obferved, that the introduction of the inftrument once or twice is not always fufficient to difcover a ftone; from the firft fears of the patient, from awkward pofition, and from other caufes, a fmall ftone may elude our touch at firft, which will fcarcely efcape being perceived, if a continuation of painful fymptoms fhould induce the neceffity of repeating our refearches. I lately attended a gentleman a confiderable time who had ftrong fymptoms of the ftone; he was fearched feveral times by myfelf and another furgeon, but the found was always fo ftrongly embraced by a fpafmodic contraction of the neck of the bladder, that it could not be freely moved, and nothing was found. He afterward went into the warm bath, where, a great degree of relaxation being produced, I paffed the catheter, and difcovered a ftone, which I afterwards extracted.

I may ſeem to have dwelt too long on this ſubject, but the operation of ſearching properly and judiciouſly is of ſuch conſequence, and frequently ſo difficult to be performed, that I think I could not have ſaid leſs; and after every inſtruction that can be given, it requires practice; and every opportunity ſhould be embraced to perform it on the dead ſubject previouſly to attempting it on the living.

When a ſtone has been felt in the bladder, and the patient, or, if an infant, his friends are convinced that there is no method of removing it but by extraction, provided there is no objection on account of the ſtate of his health, or of the parts concerned, in general the ſooner it is performed the better; as the longer the ſtone is permitted to remain, it muſt, by repeated irritation, continue to make the bladder in a worſe ſtate, and more unfit to bear any operation. Beſides, all calculous concretions are increaſing evils, con-

ſtantly growing larger and becoming more difficult to extract.

There are, however, many circumſtances to be taken into conſideration before the operation ought to be reſolved on. With regard to the ſeaſon for operating, ſpring and autumn have been preferred, but I know of no time which it is neceſſary to avoid except the extreme heats of ſummer; in winter the regulation of warmth in the chamber is in our power. The health of the patient, and the ſtate of the bladder, are conſiderations of more importance. If the patient be labouring under violent nephritic pains, the operation ſhould be delayed, as he may be in the act of forcing a ſtone from one of the kidneys into the bladder. And it would be uſeleſs to remove what is already there, if another be likely to ſupply its place, and which, it is poſſible, the ſurgeon might be ſuppoſed to have left in the bladder.—Or if the patient be affected

affected with a violent paroxyſm of ſtone in the bladder—that organ is probably at ſuch a time in more than an ordinary ſtate of irritation, and conſequently unfit to bear the operation. Under ſuch circumſtances it is better to wait, though it be for many days, till by a horizontal poſition, with the hips raiſed to let the ſtone fall from the neck of the bladder, by the aſſiſtance of gentle laxatives to open the bowels, and by warm baths and opiate clyſters, a relaxation from pain is procured. I have often remarked that the calculous patients who are admitted into the hoſpital, being brought in uneaſy carriages, and from other cauſes, generally come in pain; this ſhould be carefully attended to, nor ſhould the operation of lithotomy be thought of till the irritation be ſubſided, and the bladder reduced to as cool and unirritated a ſtate as poſſible.

If the patient feels great and continual pain

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in the bladder, even when he does not want to empty it, and if it be tender and painful on applying the hand above the pubes, we muſt conclude that it has ſuffered by the ſtone, and is in a bad ſtate. Theſe circumſtances may not be a total prohibition to the operation, but they induce an unfavourable prognoſtic of its ſucceſs.

It is poſſible that the general conſtitution of the patient may be conſiderably impaired and injured by the continual pain ariſing from a ſtone in the bladder, and yet may not be a reaſon why the operation ſhould be wholly abandoned; the cauſe being removed the effect may ceaſe, as in theſe caſes has been proved in many inſtances; but if the patient be in ſo weak and low a ſtate as to be unable to bear the fatigue of the operation, it certainly ſhould not be attempted, till by care and proper remedies his health be in ſome degree reſtored. To accompliſh this

 purpoſe,

purpoſe, if the uſual relaxing and anodyne plan fails, the milder lithrontriptic medicines, ſuch as lime water, may ſometimes be advantageouſly given; though they may not be capable of entirely diſſolving the ſtone, they may blunt the aſperities, and ſoften the ſurface of it, ſo as to prevent it for a time from giving great pain, and thus, though perfect eaſe may not be procured, ſuch a ſtate of health may be obtained as may enable him to undergo the operation.

If the patient be in good health, and the operation determined on, a preparatory regimen for a few days ſhould be obſerved; if he be inclined to be plethoric it may be neceſſary to bleed, and at proper intervals the bowels ſhould be emptied by gentle means. His diet ſhould be attended to, his food ſhould be light and of eaſy digeſtion. If he be weak and low, it may be neceſſary to ſupport him by nouriſhing diet and proper medicines.

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We will now consider him in a quiet, and, speaking comparatively, easy state, and in every respect prepared to submit to Lithotomy.

The lateral operation is now usually performed, in this, and I believe almost universally in other countries, and as it is the method which I have invariably practised, this account will be confined to it. The origin and progressive improvements of this ingenious contrivance to take the stone from the bladder, have been so repeatedly described by writers, that it is not necessary to enter into a narrative of it in this place.

The instruments which are necessary for the performance of it are, a double edged bistouri, a grooved staff, a gorget with one cutting edge, forceps of different sizes, with scoops and other contrivances, which will be mentioned in their proper places.

Previous to the operation the perinæum should

ſhould be ſhaved, the rectum emptied by an enema, and an anodyne draught may be advantageouſly given half an hour before. The patient ſhould be encouraged to drink barley water, or ſome diluting liquor, and not to empty the bladder for ſome hours before the operation, it being leſs expoſed to injury from the inſtruments in a diſtended than in a collapſed ſtate. This intention however is frequently fruſtrated by the irritation which a diſtention of the bladder produces in many calculous patients, obliging them incontinently to diſcharge its contents.

The patient being on his back on a table of convenient height, the body in a horizontal poſition, the ſhoulders and head rather elevated, and the legs hanging down; the ſtaff ſhould be introduced in the ſame manner as was deſcribed in the introduction of the ſound or catheter, and the ſtone again be felt by the operator and a conſultant ſurgeon,

geon *, the knees of the patient are then to be drawn up, and he is to be put in the proper poſition in which he is to be confined; being made to take hold of the bottoms of his feet, his hands are ſeparately and ſecurely to be attached to them by ligatures. While this is doing by the aſſiſtants the operator ſhould not quit the ſtaff, which is too frequently done, as by the alteration of poſition it may be forced out of the bladder. Or, if, on account of the inexpertneſs of the aſſiſtants he ſhould think it neceſſary himſelf to attend to faſtening the ligatures, knowing how eſſential it is to prevent them from giving way, or, if from

* The form of the ſtaff is different according to the opinion of different practitioners; ſome prefer a bold curve, thinking it to be more plainly felt in perinæo. In large, and fat patients, a conſiderable degree of convexity appears to me to be advantageous. When it is to be uſed, it ſhould be well oiled, but particular directions ſhould be given that it be not greaſed above the ſulcus; this may appear a trifling obſervation, but it really is not, as I have ſeen an operation embarraſſed from the circumſtance of the handle of the ſtaff being ſlippery.

any

any other occurrence the ſtaff has been neglected, it ſhould again be examined, and the ſtone again felt, before the inciſion is begun. This point being aſcertained, the ſtaff is to be placed ſo as that the convex part ſhall be felt projecting in the perinæum, near the raphé on the left ſide, the handle inclined a little toward the right groin, ſhould be ſteadily held by an aſſiſtant, exactly in the poſture the operator has placed it in, and the ſcrotum muſt be kept out of the way by another. The operator then, being ſeated in a chair of convenient height, and feeling the projecting part of the ſtaff, ſhould begin an inciſion a little above it near the raphé, and rather below the arch of the oſſa pubis, which ſhould be continued through the ſkin and external integuments to about an inch and an half below the curve of the ſtaff, ſlanting down between the verge of the anus and the tuberoſity of the iſchium, and ending ſomewhat

lower

lower than that procefs. This incifion fhould be freely made and of fufficient length to allow for the introduction of inftruments, and fubfequent extraction of the ftone; both which are liable to be much impeded and embarraffed by too fmall an external opening of the fkin, which does not readily ftretch or give way.

The fkin and cellular membrane being thus divided, the fubjacent mufcles are expofed, and the ftaff is plainly to be felt through them, which the thicknefs of the parts altogether generally renders obfcure. A fecond incifion is then to be made through the mufcles, in the direction of the ftaff; the groove of the ftaff fhould now be found, and it is of great importance that it be plainly felt by the finger before the incifion through the urethra is attempted, that the nail of the fore finger of the left hand being preffed into it, may ferve as a direction for the point of the knife, while the other fingers keep open the external wound.

For

For want of this precaution operators are sometimes exceedingly embarraſſed in endeavouring to cut into the groove, as without this direction the point of the knife may go right or wrong, on either ſide of the ſtaff as well as in the middle. This want of preciſion in making the diviſion of the urethra often greatly prolongs the ſufferings of the patient, and the repeated ſtrokes of the knife leave a ragged uncertain wound, in which the beak of the gorget gets entangled; but as was obſerved, the nail of the index or fore-finger being preſſed into the ſulcus proves an infallible guide; and if ſuffered to grow rather longer than uſual it will be found an advantage.

Although the inciſions through the ſkin and muſcles are moſt eaſily accompliſhed from above downward, it is ſafer to make the diviſion of the urethra from below upward, with the back of the knife toward

the rectum: And our aim ſhould be to pierce the urethra near the proſtate gland, then to carry the knife in the ſulcus upward as far as the bulb, by which the membranous part of the urethra will be completely divided.

When the groove of the ſtaff is felt ſatiſfactorily and ſufficiently bare, the beak of the gorget ſhould be introduced, being directed into it by the ſame index, and too great care cannot be taken to aſcertain that it is there ſafely lodged.

Much difficulty has ſometimes ariſen from the beak being put into the ſulcus too high, that is, too near the ſcrotum, ſo as to preſs againſt the os pubis; and people, particularly young operators, being liable to be hurried when any thing intervenes in an operation contrary to their expectation, are apt to preſs with violence, and the gorget ſlipping off the ſtaff, has ſometimes been puſhed on ſo as to paſs between the bladder and rectum.

Another embarraſſment which the operator ſometimes meets with, is from the ſtone being ſo engaged in the neck of the bladder as not to ſuffer the ſtaff to paſs in fairly; ſo as to guide the gorget into the bladder, and ſometimes this is not diſcovered till the gorget is going to be introduced and is ſtopped at its entrance. In this caſe the beſt inſtructions I can give are, to be ſteadily attentive to maintain the beak in the ſulcus, and to preſs both ſtaff and gorget gently on, into the bladder, by which, if the ſtone does not adhere to the parts which ſurround it, it will probably be carried before them into that cavity. Among the various caſes which come under our care, we muſt expect now and then to meet with unforeſeen difficulties; however, no ſuch occurring, the beak of the gorget being fixed in the ſtaff, at about the moſt convex part of its curve, ſhould be kept preſſed againſt it with the right hand, as the left muſt now be employed in taking

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the handle of the ſtaff from the aſſiſtant and holding it, by which means the reſiſtance and preſſure of one hand againſt the other is felt. The gorget is now to be preſſed gently on, till it arrives at the lower part of the convexity of the ſtaff, when the operator, well knowing and recollecting the ſweep and curve of it, will lower the handle of the gorget, and thus with certainty, keeping the beak in the channel, will purſue the direction of the ſtaff into the bladder. If it contain urine, it will immediately guſh out on the introduction of the gorget; but though the oppoſite ſide of the bladder is certainly leſs liable to come into contact with the gorget in the full, than the empty ſtate, the operator ſhould be aware that when the water is at once let out by the wound, the bladder not having time to contract itſelf gradually, will fall into large wrinkles or folds, which may be liable to be laid hold of with the ſtone.

By the introduction of the gorget the neck of the bladder and one ſide of the proſtate are ſufficiently divided. Variety of methods have been invented to execute this part of the operation. I have always uſed the common cutting gorget, which anſwers the purpoſe extremely well, and if the ſhoulder, or cutting part, be made ſo broad as to make way for the blunt and more expanded part which is to follow, the principal objection to it appears to me to be obviated.

The introduction of the gorget is not eaſy to be deſcribed, and certainly is the moſt difficult and dangerous part of the operation, for, if by any means the beak ſlips out of the groove, the gorget muſt paſs in a wrong direction, probably between the bladder and the rectum, the diſappointment and ill conſequences of which I need not enumerate. In ſhort this is the rock on which ſo many practitioners have ſplit, and to avoid the hazard

and danger of it, there have been many contrivances to fix the beak of the gorget in the ſtaff ſo as to prevent it from getting out till it is in the bladder. Some of theſe have been attended with difficulties, others have been deemed impracticable; but I am happy in having it in my power to ſay that a method has been lately practiſed at St. Bartholomew's Hoſpital, by Mr. Blicke, and has been adopted by others, which bids fair to anſwer the purpoſe extremely well. It conſiſts in the particular form of the groove of the ſtaff and the beak of the gorget. The groove of the ſtaff is left open as uſual at the convex part which projects in perinæo, and where it is uſually cut upon, after which it is narrowed, and continues ſo almoſt to the end, when it again grows wider and opens. The beak of the gorget is made with a little button or fullneſs at top, which readily enters the wide part of the groove; but is too large to ſlip out in the

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whole courſe of it, which is contracted, and conſequently it is confined, and cannot quit the route which muſt be right, till it arrives at near the end of the ſtaff, and then it muſt be where it ought to be, in the bladder. It is certainly a good plan, likely to be of great advantage to the inexperienced, and indeed muſt tend to leſſen the anxiety which the moſt experienced cannot avoid feeling on this important point. I have annexed a view of the ſtaff, ſhewing the entrance and the exit of the contracted groove, and alſo the gorget which Mr. Blicke has made uſe of with this ſtaff; it differs from the common gorget in being curved inſtead of ſtraight, and having the convex ſide applied toward the oſſa pubis. But this kind of ſtaff may be uſed with almoſt any kind of gorget, the beak being made to fit a groove like that which has been deſcribed. Except, indeed, in very ſmall inſtruments intended for infants, in which a contracted

groove

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Blake s.

groove muſt be ſo very narrow, and muſt admit of ſo very ſlender a beak, as would endanger its being broken with the ſlighteſt reſiſtance.

On this part of the operation I have only to repeat that the gorget ſhould be preſſed in gently and ſlowly; and it is ſeldom right to paſs it up to the handle, as it is ſcarcely poſſible that our inſtruments ſhall be ſo exactly fitted to every individual caſe as to make that neceſſary. When the operator is conſcious that it has fairly entered the bladder, and has quitted the end of the ſtaff, it is far enough. I have more than once known a gorget, though paſſed in the right direction, puſhed on ſo far, and with ſuch violence, as to go through the oppoſite ſide of the bladder, which may eaſily be conceived poſſible in the collapſed ſtate, when it is collected and contracted toward the neck. But if the directions laid down are obſerved, there will be

no danger of hurting it whether diſtended or not.

The gorget being introduced the ſtaff is to be withdrawn. This ſhould be done with gentleneſs, giving it the proper turn, as is uſually done after ſearching for the ſtone, or drawing off the water, in ſhort, by accommodating it to the curve of the urethra, in the ſame manner reverſed, as when it was introduced. This is too frequently neglected in the hurry of an operation, and the ſtaff being forced out with ſome violence in a ſtraight direction, preſſes againſt the neck of the bladder, and gives pain. This method of withdrawing it is always wrong, but more particularly when every circumſtance adding unneceſſarily to the inevitable diſturbance which the operation gives to thoſe tender parts ſhould be avoided.

The ſtaff being taken out, and the gorget alone remaining in the bladder, the fore-

finger

finger of the right hand should be passed into the bladder, avoiding the cutting edge of the gorget. In infants almost always, and frequently in adults, the stone lies so that it may be felt with the finger; when that is the case, it is the best possible director, and the operator is often enabled to seize it immediately, sometimes even before the gorget is removed, that is, when it happens to be above the gorget, and to be sustained by it. This situation of the stone, however, is more fortunate than frequent, and I only mention it that we may be prepared to take advantage of every lucky incident.

If the stone cannot be felt by the finger, the forceps must be carefully introduced on the gorget, and the gorget should be withdrawn in the same direction in which it was introduced. And now begins a part of the operation which demands particular attention, as success greatly depends on

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it. Very early in life I made an obſervation which has ſince been of infinite ſervice to me. I remarked that in all thoſe who died of the operation, the ſtone had been found and ſeized with difficulty; I obſerved, that when the operator could not readily find the ſtone, it was the uſual practice to ſearch after it, by chopping about in different parts of the bladder, opening and ſhutting the forceps with violence and force, whence I concluded, that though the blades of the forceps are made not to ſhut cloſe, yet that the bladder was probably bruiſed and injured by ſuch rude manœuvres *. It is better to ſearch firſt with the forceps ſhut, making them act merely as a probe or ſearcher. If the ſtone cannot be found, they may be gently expanded and

* Inſtrument makers ſometimes make the teeth of the forceps too ſharp and too near the outward edge of the blade, which is a dangerous fault. The teeth ſhould be kept conſiderably within, ſo that the outward edge of the forceps ſhould preſent a perfectly ſmooth line of contact.

made to perform part of a circle, by which means the bladder will be ſtretched, and the ſtone will often fall into the lower part of the bladder, and may be then felt and laid hold of.

If by neither of thoſe methods it is readily found, as ſometimes happens, it is better not to perſiſt in ſearching after it with the forceps, but to withdraw them, and introduce the forefinger of the left hand, by which, the gorget being out of the way, and the bladder contracted, the ſtone may generally be felt, unleſs in very large and fat perſons, where the depth is too great to admit the finger to reach into the bladder. In infants and thin perſons the ſtone may not only be generally felt by the finger, but the ſize and figure may often be determined, and the poſition of it altered by the finger, ſo as to make it more favourable for extraction.

If it cannot be felt by the finger the for-

ceps

ceps muſt again be introduced, and as it is probable that the blades of the forceps have paſſed in too far, and gone beyond where the ſtone lies, which may be either in the lower part or pouch, or toward the os pubis, the finger introduced into the rectum will ſometimes be ſerviceable in the former, as preſſure above the os pubis may aſſiſt in the latter; inſtances of both theſe I remember to have ſeen. In theſe caſes it may be neceſſary to make uſe of curved forceps, which, though not often wanted, ſhould make a part of every lithotomical apparatus.

When the ſtone is found and laid hold of by the forceps, before the blades are tightly cloſed, they ſhould be moved in different directions to be certain that no fold of the bladder is included in the gripe. If the forceps are very widely expanded by the ſtone, and great reſiſtance is conſequently made to their coming out, we may very properly doubt

whether

whether the ſtone be not taken in the moſt unfavourable poſition, moſt calculi being longer than they are broad. By paſſing the finger between the blades of the forceps, this may ſometimes be aſcertained, and a more favourable mode of ſeizing it pointed out; in which caſe I moſt perfectly agree with Mr. Cheſſelden, that it is better to let the ſtone go, and take the chance of again laying hold of it more favourably, than to perſiſt in uſing ſuch violence, as muſt, if we ſucceed in the extraction, put the well-doing of the patient into extreme hazard. By theſe means the ſmaller axis of the ſtone will often come within the forceps, and a very large ſtone may ſometimes be extracted with much comparative facility.

The manner of extracting a ſtone is not leſs to be attended to, than the finding and ſeizing it. When we are conſcious that we have fairly and advantageouſly got hold of it, the forceps ſhould be turned vertically, that

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the ſmooth ſurface of the blades may preſs on that part of the neck of the bladder and urethra which lies under the arch of the oſſa pubis, and that which lies on the rectum, rather than that thoſe parts ſhould come into contact with the ſides of the ſtone, which are often rough and irregular. In bringing out the ſtone it is better to preſs the forceps toward the rectum, than to force them againſt the arch of the pubes, which cannot yield or give way. And the extraction will be leſs difficult if we do not attempt to pull ſtraight forward, but alternately to raiſe and depreſs the handles, at the ſame time that moderate force is exerted ſo as to gain a little ground with one blade at a time, till the ſtone is brought out. To extract a very large ſtone ſome have practiſed and recommended working with the blades of the forceps ſemicircularly, or from right to left. This certainly gives great power, but is doing the greateſt poſſible miſchief, as

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the bladder and all the parts in contact with the ſtone in its paſſage, muſt be torn and bruiſed. As uſing great force, particularly in the manner laſt deſcribed, muſt be productive of great inflammation and all its conſequences, if a ſtone be too large to come away with moderate and gradual endeavours, it will be leſs dangerous to dilate the wound with the biſtouri, and this may be done by cutting the bladder on one or both ſides of the ſtone where the reſiſtance is greateſt, and the inciſions can be performed with the moſt ſafety.

It often happens that ſtones are not ſufficiently hard to bear the neceſſary preſſure, but, notwithſtanding the greateſt caution is uſed not to preſs hard, break as they are coming out. When we find them giving way, to avoid breaking them ſtill ſmaller, the forceps ſhould not be tightened, but drawn out, when they will probably bring away the nucleus, and the greateſt part of the fragments. The

pieces

pieces which are left are generally in the wound, or, if in the bladder, they are brought ſo near as to be within reach of the finger, and unleſs ſo large as to be fair objects for the forceps, are beſt removed by the ſcoop. When the forceps has been once introduced, and is withdrawn, the way in general is ſufficiently open to allow of the eaſy re-admiſſion of either the forceps or ſcoop; but if the leaſt doubt or difficulty occurs, the ſafe way is to paſs in the fore-finger of the left hand into the bladder, and upon that a conductor, previous to introducing either of thoſe inſtruments. The ſcoop will not always do alone, as it is commonly uſed, for, either the pieces will ſlip out of the ſhallow ſcoop, or the ragged fragments muſt be preſſed with violence againſt the bladder and ſoft parts, in bringing them out. To remedy theſe inconveniences I would recommend, what I have often found of great uſe, to paſs in the fore-finger after the

ſcoop

ſcoop is introduced, by the ſide of it; this will be often found doubly ſerviceable, firſt, in guiding the piece into the hollow of the ſcoop, and then, ſerving as an antagoniſt, it forms with the ſcoop a convenient ſpecies of forceps, which will bring away the ſmalleſt portion moſt ſafely and readily, ſuch as would not be at all perceptible by the ſcoop alone, or by a pair of inſenſible forceps. The ſcoops which are commonly uſed are, in general, too large in the handle to admit of the finger being introduced at the ſame time; there is no neceſſity for ſuch ſtrength and thickneſs in either the bowl or handle of the ſcoop, as little force is requiſite to bring away a fragment.

If ſmall particles, reduced almoſt to ſand, ſtill remain adhering to the coats of the bladder, it has been adviſed to waſh them away by injecting warm water; this may be readily done through a female catheter. But, when the

the bladder becomes naturally diſtended after the operation, the firſt guſh of urine through the wound anſwers this purpoſe much more effectually than it is in our power to do.

The breaking of a ſtone is generally an unpleaſant circumſtance, as it is unſatisfactory to both patient and ſurgeon not to ſee it come away entire, and it prolongs the operation; but if the ſtone be very large it may prove of conſiderable advantage to the patient. I have known ſtones extracted of ſuch magnitude, as muſt have required ſo great force to bring them away, that it was ſcarcely to be conceived that the patients ſhould recover, and who, I am confident, would not have ſtood a bad chance of getting well, if the ſtones had been of a leſs firm texture, and had given way in the operation. Some have been found of ſuch ſize as to make their extraction impracticable, and have been left in the bladder. Caſes of this kind have induced prac-

titioners

titioners to invent an inſtrument of more force and ſtrength than the common forceps, by which a large ſtone may be broken, and afterwards extracted piece-meal by the common inſtruments.

By theſe means, though the operation is protracted, the opening into the bladder is not neceſſarily ſo dilated, nor are the parts expoſed to ſo much preſſure and fatigue in the extraction, by which the danger is proportionally leſſened; for it is a truth which cannot too often be inculcated, that the length of time which an operation for the ſtone may require, does by no means neceſſarily increaſe the danger of it. Sat cito ſi ſat bene, was never better applied than to this operation. The danger of it does not ariſe from the number of times which it may be neceſſary to repeat the introduction of the inſtruments, but on the degree of force or violence with which they are uſed. It ſhould never once

ſlip the memory, that though the extraction of the ſtone is the immediate object, the ſafety of the patient ſhould be the principal conſideration, and that little honour can be derived from the quick performance of an operation which proves deſtructive.

If little or no injury is done to the bladder except the neceſſary wound with the gorget, it approaches nearly to a ſimple inciſion, which is well known not to be particularly dangerous in that viſcus.

It is commonly remarked, that if the ſides of a ſtone when extracted are ſmooth and poliſhed, it is an indication that there are more than one; if rough, and the aſperities not worn, that it was ſingle: however theſe marks are not abſolutely to be depended on, as we have ſeen ſingle ſtones frequently ſmooth, and ſometimes rough where there have been more than one. The only way of certainly judging, if the bladder be emptied, is, by ſearching

with the finger, or if it be too deep, with the forceps shut, or an instrument called a searcher.

I have hitherto described the operation as it is to be performed in cases which are most commonly met with, but in a variety of practice, circumstances may sometimes occur, which, to an experienced operator, will appear new. We hear and we read of cases in which, though the stone has been plainly felt by the forceps, yet could not be taken hold of so as to be brought away, though attempted in the most skilful manner. This certainly may happen if the stone be contained in a sacculus, only a small part being exposed to the touch of the instrument, and probably would have happened in the case of Gardiner, the person who was the cause of Mrs. Stevens receiving the reward from Parliament for a medicine which had the character of dissolving the stone. When the person died, his bladder was exa-

mined, and ſeveral ſtones were found concealed in different ſacculi, which, not being liable to be preſſed on by the bladder, gave no pain, nor could be felt, and were conſequently ſuppoſed to be diſſolved. Such caſes very ſeldom occur; in my own practice I have met with but one inſtance in which it was probable, but not proved, that there was a ſacculus. Some account of this caſe it may not be unuſeful to mention. A boy, about five years old, was afflicted with ſymptoms of the ſtone. On ſearching him a ſtone was felt, and the operation was determined on. A few days after, when I was going to do it, and had introduced the ſtaff, no ſtone could be perceived, on which the operation was deferred. The painful ſymptoms returning he was again ſearched, and the ſtone was again felt, and the ſound of it, when ſtruck by the inſtrument, diſtinctly heard. In conſultation it was determined that the operation

ſhould

ſhould be performed. On putting him in the proper poſition, the ſtone again was not to be felt; however, as his ſufferings required relief, and the ſtone having been perceived to the conviction of every one preſent, could not poſſibly have eſcaped from the bladder, it was reſolved to purſue the operation. Accordingly I performed it, but when the inciſion was made no ſtone could be found by the finger or any inſtrument. On which the boy was dreſſed and put to bed. In a few days a ſtone ſhewed itſelf at the wound, and I took it away; it was rough, irregular, and about the ſize of a hazel nut.

I was preſent at another operation on a boy, on whom a ſtone had been felt, but could not be found at the time of the operation, nor was any diſcovered during the healing of the wound; but ſome time after it was completely healed, and the boy ſuffered to walk about, he one day complained to me that he felt ſome-

thing hard near where he was cut. I felt, and plainly perceived a ſmall ſtone under the ſkin in the perinæum, within half an inch of the beginning of the inciſion; I made an opening and took it out, and it is now in my poſſeſſion. It is probable that both theſe ſtones were encloſed in ſacculi at the time of the operations, and that afterwards, ſome poſition favouring their exit, they found their way into the cavity of the bladder. The ſubſequent paſſage of them through the wound was a fortunate, though a natural conſequence, and leads to hope, that if by accident a portion of the ſtone ſhould at any time be left behind, that it would, in like manner, be diſcharged by the contraction of the bladder.

The ſtone will ſometimes be ſo engaged with the neck of the bladder, that, though the ſtaff and gorget have paſſed, there is not room for the forceps to enter far enough to take hold of it; or, if they paſs in, go beyond,

yond, so that they chop on it near the joint, and cannot seize it. This is a difficult and troublesome case, however the operator will frequently succeed by withdrawing the forceps, and endeavouring to push the stone before it into the bladder; sometimes, if the stone be hard and irregular, it may be possible to get sufficient hold of it with a small pair, without forcing it out of its position.

Another very unpleasant case is when the stone lies buried in a fungus. Ruysh, Heister, and other authors, have mentioned cases of this kind. Such sometimes, though seldom, occur: fortunately I have met with but one instance which has fallen under my particular care. This was in the person of a young man who was sent from Rochester to St. Bartholomew's hospital, and as there were some singular circumstances attending it, I shall take the liberty to relate them.—He was about eighteen years of age, had been afflicted with

ſymptoms of the ſtone during ſeveral years, and had ſuffered exquiſite pain, which had nearly worn him down to the extreme verge of life: from his emaciated appearance little hopes were entertained of his recovery; however, as his diſeaſe had originally ariſen from, and had been cauſed by a ſtone, which was plainly to be felt, I could not refuſe him the only chance he had of relief. On paſſing in the ſtaff it met with great obſtruction at the neck of the bladder, and when introduced was firmly fixed, and the feel of a ſtone at the end of the inſtrument very diſtinct; the gorget paſſed with equal difficulty. On attempting to introduce the forceps, I found it impracticable, as the ſtone had completely blocked up the paſſage, and I was obliged to withdraw the gorget; the patient being very thin and relaxed, I was able to examine accurately with my finger the ſtate of the parts. I found a large hard ſubſtance filling the

the whole neck of the bladder, containing a rough ſtone, bare only in one part, and apparently immoveable. On reflection I conceived it might be poſſible to get ſufficient hold of it without altering the poſition; accordingly, my finger ſerving as a director, I paſſed in a ſmall pair of forceps, and was able to open them ſufficiently to get hold of part of its craggy ſurface, when fortunately it came away without it being neceſſary to uſe much force. On examining the ſtone, it had evidently adhered to the neck of the bladder, and had lain in a fungus, as the inequalities were in every part filled with a fleſhy fungous ſubſtance; but I was happy not to be able to diſcover in any part, any thing like the membranous coat of the bladder; indeed, the reſiſtance to the extraction would have been greater if the bladder itſelf had been torn: the form of the ſtone will beſt appear in the annexed figure; it completely filled the neck and lower part

of

of the bladder, and a proceſs about one inch and a half in length, extended down the paſſage of the urethra. In the ſuperior part of this proceſs, or that which lay toward the pubes, was a groove through which the water had paſſed, after having trickled down between craggy parts, ſo that among all his complaints he had never experienced a ſtoppage of urine; indeed this is a ſymptom, which, as has been remarked by that accurate obſerver Mr. Pott, people with adherent ſtones never ſuffer. The ſtaff had made its way between the lower part of the ſtone and the urethra, and the gorget had evidently followed the ſame route: no material hæmorrhage ſucceeded the operation, nor did the patient experience any bad ſymptoms, but ſuch as aroſe from his extreme weak ſtate; he loſt all painful complaints, the wound perfectly healed, and he returned to Rocheſter, where he lived many months after the operation.

Stones adherent to the bladder, as was observed, are very uncommon; probably, when they happen, the adhesion is caused, as in the present instance, by fungous excrescences, produced by irritation and inflammation from the internal coat of the bladder, and shooting into the cavities of the stone. The case here recited is a strong instance of the practicability and safety of removing such stones, provided the membranous coat of the bladder itself be not injured by the extraction *.

The

* Some other human calculi are included in the plate, remarkable for their size or shape.

Since these sheets were in the press I have seen a case, which, in point of situation of the stone, was similar to that which I have been describing; in a boy about five years old, in whom the entrance into the bladder was so completely blocked up, as to make the passage of a staff absolutely impracticable.—The extraction of it was performed by a gentleman, whose rising fame I have pleasure in contemplating, who, whether considered as a practitioner in surgery, a teacher of anatomy, or a philosopher, deserves to be mentioned in the most encomiastic terms.

On introducing the staff, it would pass but a little way beyond

The next circumſtance to be conſidered is, the hæmorrhage. I believe it may be laid down as a fact, that if the bulb be not divided in the diviſion of the urethra, that there is ſeldom any conſiderable hæmorrhage, but I do

beyond the inferior arch of the pubes, or beginning of the membranous part of the urethra. After having divided the integuments, Mr. Abernethy made an inciſion on the end of the ſtaff, which was then withdrawn, and paſſing the finger into the urethra, a large ſtone was plainly to be felt. As it was impoſſible to introduce a gorget, he paſſed a probe pointed knife by the ſide of the ſtone, and divided the remainder of the urethra and neck of the bladder, in the direction in which it is uſually divided by the gorget; he then endeavoured to uſe a pair of forceps which he had provided with ſeparate blades, which were to be connected by a center pin, nearly like thoſe uſed in midwifery: one blade paſſed eaſily, the other with more difficulty, and not deep enough to admit of connexion with the other at the center. Not finding them anſwer, a pair of common forceps were uſed, which being made to expand carefully without injuring the bladder, the ſtone was laid hold of, but broke in coming out; it was ſeized again, but again receded when nearly brought out: it was now obſerved that the forceps had been badly tempered, and had bent and given way. On another pair being introduced it was extracted, and proved to be a large, ſoft, and ragged ſtone; the part which was extracted whole was about one inch and a half

do not by any means aſſert that it is always in the power of the moſt ſkilful operator to avoid it. The arteries moſt liable to be wounded in this operation are the pudicæ externæ, the principal branch of which, on each ſide, running on the inſide of the tuberculum iſchii,

half in diameter. On ſearching with the finger another was found in the cavity of the bladder, which was eaſily extracted, and proved a ſtone of uncommon form, being perfectly cylindrical, about two inches in length, and three-fourths of an inch in diameter, and ſeemed to have been moulded to ſome cavity. It appeared to me, that by ſome previous operation of endeavouring to paſs a ſtaff, or by ſome unaccountable accident, that the two ſtones had changed places, that the one which had been originally formed in the urethra had ſlipped into the bladder, and that which had been formed in the bladder had been forced into the urethra; which was the more probable, as the urethra muſt have been greatly dilated by the formation of the cylindrical ſtone; and that ſtone being diſplaced, the paſſage was ſufficiently open to receive any other which might be forced into it. Notwithſtanding the neceſſary tedious-neſs of this uncommon operation, the bladder having been carefully kept from injury, the child paſſed a good night, and was without a bad ſymptom the following day. I have the pleaſure to add, that all danger is paſſed, that he continues to improve, and is in a fair way of doing well.

and following a little way the courſe of the erector penis, and crura of the corpus caver-noſum penis, is in the way of the knife. It often happens that ſome of the ramifications of theſe veſſels are divided, either by the inſtruments, or ſometimes by the angles of a rough ſtone in its paſſage out: if the veſſel be large and bleed freely, and can be eaſily got at, it may very properly be ſecured by a ligature, but if very deeply ſeated, and out of ſight, it is, generally ſpeaking, better to leave it than to ſearch and poke after it. The preſſure of the ſides of the wound againſt each other will probably be ſufficient to ſtop it: it may continue for ſome time to bleed into the bladder, and to be voided by the penis, which certainly appears alarming to perſons unaccuſtomed to ſee it, and moſt undoubtedly a very unpleaſant circumſtance it is, to ſee a hæmorrhage which we cannot maſter; yet, I ſpeak from

my

my own experience and from that of the late Mr. Pott, that I never knew a bleeding after an operation for the ſtone prove of material, or ſerious conſequence; at the ſame time, I do not deny that there may be caſes in which the hæmorrhage may be ſo violent as to make it abſolutely neceſſary to find the bleeding veſſel, or if that be not practicable, to apply ſtyptic applications, by means of a tent paſſed into the wound, to reſtrain it; I only mean that if it can be avoided it will be advantageous, as all ſuch applications tend to increaſe inflammation, and prevent the union of the ſides of the wound. It ſometimes happens, that though there be no bleeding of ſufficient conſequence to be noticed immediately after the operation, and the wound be conſequently dreſſed, a ſmall weeping of blood will come on when the patient is warm in bed, which, in an hour or two, will increaſe

to

to ſomething conſiderable: on taking off the bandage and dreſſings the wound will be found filled with coagulum, and a ſmall ſtream, from time to time, iſſuing from under it; this may reaſonably be ſuppoſed to come from one or more ſmall veſſels; as it is probable that a large one would have bled in the firſt inſtance: it is in vain to expect, as has been aſſerted, that the coagulum will ſtop the bleeding; on the contrary, it will rather tend to increaſe it, by keeping the mouths of the veſſels in a ſtate of relaxation and moiſture, at the ſame time it conceals the place whence the bleeding originates. The whole of the coagulum ſhould therefore be immediately removed, and the bleeding will generally be ſeen to ariſe from ſeveral ſmall veſſels; when this is the caſe, the mere expoſure to the cold air, being ſo ſtrongly contraſted with their prior warm ſituation, is generally, alone, ſufficient,

in a very ſhort time, to contract the mouths of the veſſels, and cauſe the hæmorrhage completely to ceaſe, without ſtyptic or any other application *.

With regard to the manner of dreſſing the wound, we read of cannulæ and tents being introduced; but, if the operation has been properly performed, and the whole of the ſtone extracted, there can be no reaſon why it ſhould not be dreſſed ſimply and externally, like any other accidental wound; the ſides of the wound, being thus ſuffered to come into

* This obſervation is applicable to other operations, ſuch as amputations, or the removal of large tumors; in which it often happens that ſmall divided veſſels, apparently quiet at the time of dreſſing the wound, are afterwards excited to emit their contents by the warmth of the dreſſings, bandages, and bed, added to the increaſed circulation which always takes place after operations of conſequence. When the wound is undreſſed, the coagulum removed, and the ſurface completely laid bare, an alarming bleeding appears flowing from numberleſs mouths, but theſe ſhrink and contract ſo ſoon as they are expoſed to cold air, and, provided the larger veſſels were ſecured at the time of the operation, all appearance of hæmorrhage ceaſes, and there is no return.

immediate contact, would unite like an incision in any other part, but for the interruption which is caused by the passage of the urine, which washes away the agglutinating medium and hardens the superficies; the time when this ceases to flow through the wound differs from a variety of circumstances, such as the size of the wound and constitution of the patient; but this period may be sometimes accelerated by very simple means: as these may be useful and worth attention, I shall take the liberty to explain my meaning, by relating some circumstances relative to an operation which I lately performed on a gentleman about thirty-five years of age. The stone which I extracted was not large, and the wound so little injured by its passage out, that it was scarcely more than a simple incision; the greater part of the urine came by the penis the first night, and so continued to do till the

the fifth day, when it ceafed to come by the wound at all, and the whole paffed through the penis during two nights and two days, when the patient having inattentively fuffered the bladder to be very full, and endeavouring to empty it at the fame time that he had a ftool, it again burft its way through the wound; I directed the nurfe to tie the bandage rather tighter, defiring him to empty the bladder more frequently, and every time that he made water, or fneezed, coughed, or, in fhort, ufed any exertion, to apply his hand to the fides of the wound, and to keep it clofed: by attending to this plan, not a drop afterwards efcaped, and there was no further interruption to the healing of the wound, which was completed in as fhort a time as a wound of the fame fize would have healed in any other part *. I cannot avoid noticing an obfervation

* It may not be unufeful to remark in this place, that I have many times cured that moft difficult and troublefome difeafe,

obſervation which this Gentleman repeatedly made during his cure, that he would rather ſuffer the operation every fortnight to the end of his life, than to live liable to feel what he had experienced in fits of the ſtone.

It ſhould be mentioned, that it is right to keep the knees of the patient cloſe together, particularly if he be an infant, by a tape paſſed round them during the firſt part of the healing of the wound, or indeed till the urine has found its natural paſſage; that the beſt poſition for patients to lie in is, in general, on the right ſide, as that gives the wound an op-

diſeaſe, the fiſtula in perinæo, and in ſome inſtances where the water found its way through ſeveral openings, by making patients attend to the ſimple manœuvre of preſſing with the hand during micturition, on that part of the urethra from whence the water iſſued. Of ſuch importance it is to give nature an opportunity of purſuing her own proceſs, which is always tending to heal and conſolidate, unleſs checked by ſome diſeaſe or accidental circumſtance. Thus, if the urine can be prevented for a certain time from paſſing through the opening in the urethra, the external openings, and all the parts, have an opportunity to regain their natural tone and diſpoſition to heal.

portunity

portunity of discharging itself, and that the patient should not be suffered to rise and walk, till the urine passes through the natural passage, and till the greatest part of the wound is healed. Excoriations of the skin may be prevented by placing a sheet under the patient several times doubled, so as to be in breadth about eighteen or twenty inches; it must be coiled up, all but as much as is necessary to be laid under him. At first the remainder of the roll is put by his side, which unrolls as the nurse draws the wet part from under him; by this method he is kept almost constantly dry.

The fate of those who undergo the operation of lithotomy, may generally be prognosticated in the space of a few hours: if the operation has been well and happily performed, no other care is requisite than to repeat the anodyne so soon as the patient is placed in a warm bed, and to keep him perfectly quiet.

If all goes on right, he usually soon gets sleep, and in a few hours after the operation a discharge of water gushes from the wound. It may be proper to remark, that as this is generally very much mixed with blood, which has found its way into the bladder, it is often mistaken for a violent hæmorrhage, and is very alarming to nurses and people unaccustomed to see it, but if the linen which is coloured with it be examined, the dilution of the blood will be apparent, and the urinous smell will confirm it. In the happy sequel of the operation I am now describing, the belly continues soft, and no pain is felt from gentle pressure; the night is passed in the same calm state, and he is found refreshed in the morning: these favourable symptoms continuing till the third day, all danger derived from the operation may be concluded to be past; but our attention to the general health of the patient should not be less: his diet should be

light

light and of eaſy digeſtion, yet ſufficient to ſupport and give ſtrength; his bowels ſhould be gently relaxed, and occaſional clyſters, I have ever found, moſt eſſentially ſerviceable.

If the bladder has received material injury from the ill performance of the operation, from the ſhape and figure of the ſtone in its paſſage out, or from any other cauſe, the good and hopeful ſymptoms deſcribed are, too often, completely reverſed. Soon after the patient is in bed his pulſe increaſes, he feels a degree of reſtleſſneſs and anxiety, and with difficulty is perſuaded to remain quiet in any poſture; if ſome ſleep be procured by opium, he ſtarts and wakes, and feels a tenſion and pain in the lower part of the belly or region of the bladder, which will not bear even gentle preſſure. And no water coming through the wound in a few hours after the operation is always an alarming circumſtance.

When ſuch ſymptoms approach, the moſt powerful means are immediately to be employed; among theſe are to be enumerated oily purgatives, anodyne and antimonial draughts, emollient and anodyne clyſters, fomentations, and cataplaſms applied to the abdomen; but, above all, that univerſal relaxation which can only be procured from the warm bath, ſhould not be neglected. A bathing tub, though not always neceſſary, ſhould be at hand and ready after every operation for the ſtone, which, if required, may be eaſily conveyed into the patient's chamber. If it be thought right to immerge him in it, he ſhould, when taken out, be put between blankets, and a gentle ſudorific ſhould be given; as ſoon as this takes effect, and produces a moiſture on the ſkin, the patient frequently becomes eaſy, and the fever abates. By ſuch means we are ſometimes able to meet and repel the approach-

ing miſchief, but, as fire is moſt eaſily quenched on its firſt appearance, our ſucceſs greatly depends on the early application of them.

If, in oppoſition to our beſt endeavours, the inflammation does not abate, it is ſoon communicated from the bladder, where it begins, to the ſurrounding cellular membrane; the ureters and kidneys uſually ſoon receive the alarm, nephritic pains are excited, and little or no water is ſecreted; if it extend over the peritonæum and inteſtinal canal, it produces an antiperiſtaltic motion, followed by pains and frequent nauſea, and the inflammation ſtill increaſing, a mortification often takes place: increaſe of fever, continual pains, and ſwelling of the hypogaſtric region, are the firſt ſigns of its approach, tenſion of the whole belly, attended with hiccough and vomiting, ſoon follows, the pulſe ſinks, the patient grows weak, and in a ſhort ſpace of time the painful ſcene is over.

I have obſerved that the female ſex, from the form and ſituation of the urethra, are leſs liable to the formation or retention of ſtones in the bladder than men; for the ſame reaſons, when they are formed, the operation for the extraction of them is proportionally leſs difficult. The ſhortneſs and direct courſe of the urethra permitting the ſound to be turned freely in every part of the bladder; we have greater opportunities of judging not only of the ſize of the ſtone, but in ſome degree of its ſhape and the irregularities on its ſurface, which may tend to point out the beſt method of taking hold of and extracting it.

The methods propoſed are, either by the dilatation or the diviſion of the urethra. If the ſtone be of very ſmall ſize the firſt is certainly preferable. It has been attempted by various means, ſuch as ſponge tents, dried gentian root, and an inſtrument called ſpeculum veſicæ, by which ſufficient room has been made

for

for the introduction of the neceſſary inſtruments. A caſe has been related in which an ingenious contrivance ſucceeded remarkably well; the appendicula inteſtini cœci of a ſmall animal being introduced into the bladder, warm water was thrown into it by the open end, which was left out of ſufficient length, and was prevented from eſcaping by a ligature; it was then twiſted a turn or two, that the water being preſſed on might diſtend the cloſe end in the urethra. This was repeated from time to time, ſo as to fill it more and more, as the cervix veſicæ opened; thus, by degrees, in this inſtance, ſufficient dilatation was made to permit the exit of the ſtone without the neceſſity of any other operation. This appears to be preferable to the ſponge or the other ordinary methods; but unleſs the ſtone be of ſuch ſize as to give hopes of its paſſing without the neceſſity of introducing any inſtrument, or only one of a ſmall ſize,

I ſhould

I ſhould prefer the diviſion of the urethra to violent diſtention, as I conceive the power of retaining the urine more likely to be recovered after the former than the latter.

When the operation is determined on, the time to be choſen for it ſhould be the interval between the monthly evacuations. The ſituation in which the female patient is to be placed, is that which has already been deſcribed for men. The female ſtaff is to be introduced into the bladder with the groove toward the vagina, and the cutting gorget appears beſt calculated to make the diviſion of the urethra; the beak of it ſhould be fixed in the groove of the ſtaff, and preſſed gently on till it arrives in the bladder, by which the neck of the bladder is ſufficiently divided, and neither bladder nor vagina is liable to be injured; the ſtone ſhould then be examined by the finger, and the extraction ſhould be attempted and conducted by the forceps, in

every

every reſpect as recommended in the operation on men. After the operation the ſame conduct ſhould be obſerved, and it will be right to let them lie on the right ſide, to prevent as much as poſſible the urine from inſinuating itſelf into the wound, which would impede the union of the divided parts; the reſtoration of the natural ſtate of the neck of the bladder, and conſequently the power of retaining the urine, depend greatly on the proſperous and ſpeedy healing of the wound.

The ſtone being in general more eaſily extracted from women than men, and the whole of the operation leſs complex or difficult, the conſequences of it are proportionally leſs hazardous; but from long experience I can truly aſſert, that in either ſex when the operation of lithotomy is properly performed, the event of it is much more favourable and ſucceſsful than it has been repreſented to be. So long ago as when Mr. Cheſſelden practiſed, we

learn, from his own account, that, out of 213 whom he cut, 20 only died. I hope and trust that since his time we have not gone backward either in knowledge or ſkill; on the contrary, I am inclined to think, that, principally with the aſſiſtance of that moſt excellent invention of Sir Cæſar Hawkins, the cutting gorget, we have greatly improved the operation, and rendered it more ſafe and proſperous.

In ſome degree to corroborate what I have advanced, I ſhall follow the example of Mr. Cheſſelden, in relating what has happened in my own practice. My firſt operation of lithotomy was in the year 1770, at St. Bartholomew's Hoſpital, after which I occaſionally performed it in the abſence of the principal ſurgeons till 1776, when, from the accidental inability of Mr. Crane, the operative part of his duty devolved on me; from that time I have operated on one-third of all the ſtone

patients who have been received into that houſe, beſides many in private: in the earlieſt part of that period, not foreſeeing that I ſhould one day wiſh to recollect them, I was not attentive to make memoranda of every caſe which occurred; I have an account of forty-ſeven, but the total amount unfortunately I have no means of aſcertaining; however, I feel the greateſt poſſible ſatisfaction in being able to declare, that of all the patients I have ever cut for the ſtone, in public or in private, one only did not recover; and as there were peculiarities in the caſe of that perſon, in juſtice to the operation, they ſhould be noticed: when I firſt ſaw him he was a healthy young man about twenty years of age, and in every reſpect as good a ſubject as could be choſen: the ſtone was readily to be felt, and the operation was recommended, but it was not complied with, the patient having been adviſed to endeavour to get rid of it by a

courſe

courſe of lithontriptic medicines: theſe were given and perſevered in above two months, but unfortunately they did not only fail of diſſolving the ſtone, but did not relieve the pain, which continued to diſtreſs him, in an uncommon degree, during the whole time: at laſt, worn out with pain and much impaired in health, he begged to have the ſtone removed; this was accordingly done, with the faireſt proſpect of ſucceſs, as far as regarded the operation: the ſtone was immediately and fortunately ſeized, and readily extracted; no hæmorrhage, nor any bad circumſtance occurred; and there was every reaſon to expect ſucceſs. He paſſed the next night and day well, and ſo continued to the third day, when he appeared ſo well, that there was not room for an anxious thought about him: on the fourth day he was ſeized with a rigor, and expired in a few minutes: his bladder was examined after death, and was found thick-

ened

ened and diseased, bearing evident marks of the continued inflammation and irritation which it had suffered from the rough surface of the stone, and perhaps from the action of the solvent medicine*.

I conceive the loss of this patient cannot be fairly ascribed to the operation, as the dangerous symptoms which arise from the performance of it take place much earlier; and it is probable that, had it been performed when the bladder was in a better state, it might have perfectly succeeded; I speak this with some degree of confidence, as he appeared, when first I saw him, as was observed, a healthy promising subject.

Those which have fallen to my lot have

* The recollection of this case leads me seriously to recommend not to perform the operation of lithotomy in less than a month, from leaving off a course of what are called lithontriptic medicines, and during that time to keep the patient in a quiet state, in order to give the bladder the best opportunity of recovering from the irritation which it has suffered.

 been

been of almoſt all ages, from under two years to near ſeventy. Some of the ſtones extracted from them were very large, others of a dangerous kind from the irregularities and aſperities of their ſurface; and in ſome caſes conſiderable difficulties occurred in extracting them. Among the number of patients alſo, as may be ſuppoſed, were many bad ſubjects, from age and from conſtitution, as I do not know that I ever rejected one: yet, out of them all, I repeat, that this young man alone did not recover.

I have now, to the beſt of my abilities, completed what I at firſt propoſed, and have unreſervedly communicated the reſult of my experience; ſhould it in any degree tend to ſtrengthen the reſolution of the afflicted, or to aid the hand adminiſtering relief, my intention will be fully anſwered.

I cannot, however, conclude without ſaying ſomething by way of apology for any ap-

pearance of oſtentation in having given an account of my own practice.—Perhaps, the many anxious hours which, previouſly to an operation of ſuch importance, every humane practitioner muſt paſs, and which a continuance of ſucceſs will not avert, might allow a ſmall ſhare of pride to ariſe from the ſucceſsful performance of it. On the preſent occaſion I can only ſay, that I thought it proper to be produced in vindication and ſupport of a neceſſary and uſeful operation.

AN

APPENDIX

TO

A TREATISE

ON THE

OPERATION FOR THE STONE;

CONTAINING

THE DESCRIPTION OF AN INSTRUMENT CALCULATED TO IMPROVE THAT OPERATION.

By *JAMES EARLE*, *Esq.* *F. R. S.*

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1796.

THE operation of lithotomy has [illegible]
[illegible] the pains of many ingenious
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APPENDIX, &c.

THE operation of lithotomy has engaged the attention of many ingenious men, and a great variety of inſtruments have been contrived for the performance of it. In this country the grooved ſtaff and cutting gorget are moſt generally in uſe, and from the ſimplicity of their conſtruction, which muſt be admitted an excellence in all chirurgical inſtruments, they will probably continue to ſuperſede many other inventions: yet well contrived as theſe inſtruments are, they appear to me capable of being improved. In the following pages I ſhall take

the liberty to offer to the consideration of practitioners a method which has recently occurred to me, and which, as I conceive, will render the operation less painful and hazardous, and prevent the inexperienced operator from error in the performance of it. As it is a subject which interests a considerable part of mankind, I have not delayed to make it public, that if, on examination, the instrument which I shall describe be thought worthy of being adopted, its use and application may be thoroughly understood, and the knowledge of it more generally extended.

In 1793 I published a treatise on the operation of lithotomy, in which I endeavoured to describe the best method I then knew of performing it. In that part which relates to the introduction of the gorget (page 50) it was observed, that the first and greatest difficulty in the operation occurred in introduc-

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ing the beak of the gorget into the groove of the ſtaff; and in conducting it into the bladder; that the principal danger in this part of the operation aroſe from the poſſibility of its ſlipping out before it entered the bladder, and paſſing between the bladder and rectum; that many fatal accidents of this kind had happened from this circumſtance; and that the apprehenſion of them was a cauſe of anxiety to every operator. To remedy this inconvenience, and to take away every chance of ſuch an accident, and alſo to enable the ſurgeon to execute this part of the operation with more confidence, I deſcribed an improvement which had been invented in the ſtaff, which conſiſted in making the groove narrow immediately beyond the part which admits the beak of the gorget, and in continuing the contraction to near its extremity, ſo that the beak of the gorget being made with a ſmall neck, and a

little button or fulneſs at the top, readily enters into the wide part of the groove, but cannot ſlip out again, till it arrives at the end of the ſtaff, when, if the ſtone has been previouſly felt with the ſtaff, it muſt be in the bladder. This contrivance, after repeated experiments, has been proved to anſwer the purpoſe extremely well, having been frequently uſed with ſucceſs at St. Bartholomew's Hoſpital, as well as in private practice. Still however the operation appeared to me imperfect, as I obſerved that in the diviſion of the urethra, in order to find the groove of the ſtaff, a conſiderable difficulty frequently occurred, inſomuch that it became neceſſary to make ſeveral cuts or inciſions down to the ſtaff, before the way was ſufficiently open, and the ſtaff laid ſufficiently bare to admit the beak of the gorget to enter ſatisfactorily into the groove; not to mention the riſk of the gorget's hitching

in ſome of theſe ragged inciſions, and ſlipping on either ſide of the ſtaff, which ſometimes happened. It was impoſſible not to remark, that ſome of theſe circumſtances often very conſiderably prolonged, and increaſed the pain and hazard of the operation.

The difficulties and obſtructions which have been ſpecified, may ariſe from ſeveral cauſes—from the thickneſs of the urethra and muſcles which cover it, preventing the groove from being diſtinctly felt; from the mobility of thoſe parts, whence they are liable to ſlip on one ſide of the ſtaff; from the unſteadineſs of the hand of the aſſiſtant who holds the ſtaff; from the motion of the patient throwing it out of its poſition and altering its ſituation; or, laſtly, from want of dexterity in the operator.

Whoever has been accuſtomed to ſee the operation of lithotomy performed by dif-

ferent ſurgeons, muſt be ſenſible of the inconveniences and frequent embarraſſments attending this part of it, and muſt, I think, admit that great advantage would be obtained if a mode could be adopted by which the groove could be immediately laid bare ſo as to admit the introduction of the gorget without any delay or uncertainty; at leaſt I muſt confeſs that the attainment of this object always appeared to me very deſirable, and I feel no ſmall degree of ſatisfaction in conceiving that I have overcome the difficulty by the contrivance of an inſtrument which will make the opening through the urethra with diſpatch, certainty, and preciſion.

The inſtrument conſiſts of a ſhort ſtaff, with an open groove, connected by a hinge to the handle of another ſtaff of the uſual ſize, ſhape, curvature, and length, but which, for the ſake of diſtinction in deſcribing the

inſtrument,

inſtrument, I ſhall denominate the *long ſtaff*. The hinge by means of a pin or moveable axis is capable of being disjointed at pleaſure. The ſhort ſtaff is ſufficiently curved to go over the penis and ſcrotum, and long enough to reach to that part of the long ſtaff which is juſt below the beginning of its curvature. The end of the ſhort ſtaff made ſomewhat like a pen, with the ſides ſharpened and finely pointed, is adapted to ſhut into the groove of the long ſtaff, and its cutting edges are defended from being injured by a proper receptacle which is prepared for it in the groove of the long ſtaff. When the inſtrument is ſhut, the groove of the ſhort ſtaff leads into that of the long ſtaff, ſo as to form one connected and continued groove. It is neceſſary that the ſhort ſtaff be made ſtrong and firm, to reſiſt any lateral preſſure; and, for the ſame reaſon, a ſegment of an arch is fixed on the long ſtaff at a ſhort diſtance

from the hinge; which being fitted to pass through an opening in the short staff, effectually keeps it steady, and prevents the point from deviating on either side of the groove, so that when shut down the point of the short staff is certain of passing into the cavity formed for its reception. The annexed plate will perhaps give a clearer idea of the instrument than is in the power of verbal description to convey.

It will be observed that the engraving is taken from an instrument adapted to a staff with the contracted groove, and that the point is made to shut in just where the contraction of the groove commences. But as every one may not be in the habit of using, or may not approve of the staff with the contracted groove, it is proper to remark, that this contrivance is in every respect equally applicable to the common staff; and indeed may be made to fit with greater faci-

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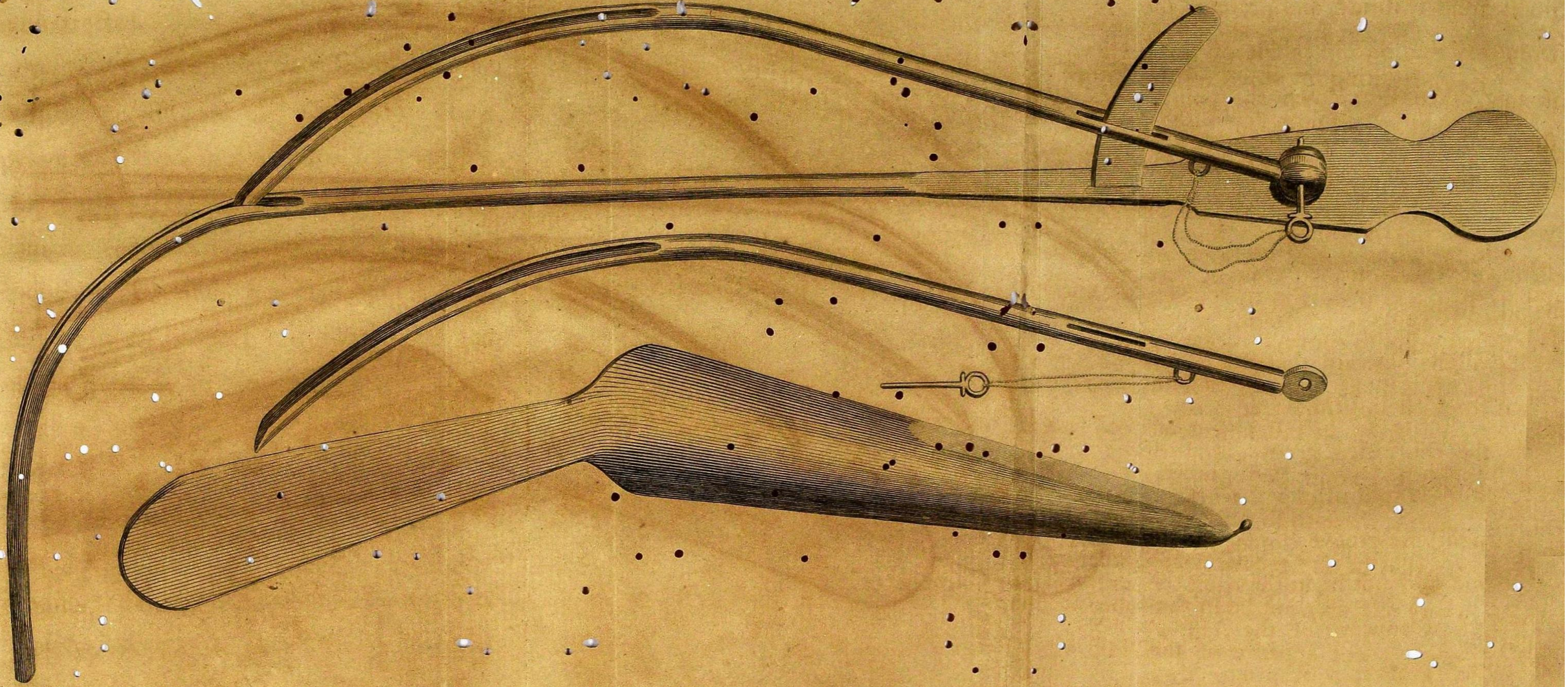
To face p. 8. Appendix.



lity and exactneſs into a ſtaff where the groove is open than into one in which it is contracted.

We will now conſider the uſe and application of the inſtrument. The patient being placed and fixed in the uſual ſituation for the operation of lithotomy, the long ſtaff unconnected with the ſhort one is to be introduced in the uſual manner into the bladder. The ſtone being ſatisfactorily felt, the ſhort ſtaff is to be connected at the hinge, which by means of the pin is eaſily effected. The inciſion is then to be made in the uſual manner through the ſkin and cellular membrane, and a ſecond inciſion through the muſcles, ſo as nearly to lay bare the urethra. The operator then being perfectly convinced that the extremity of the long ſtaff is ſafely and ſufficiently introduced into the cavity of the bladder, muſt bring the end of the ſhort ſtaff down, and preſs it againſt the urethra, which

which it will immediately pierce through and paſs into the cavity prepared for it in the groove of the long ſtaff. I muſt repeat that the operator ſhould be thoroughly ſatiſfied about the ſituation of the long ſtaff before he brings down the ſhort ſtaff, becauſe, after the two are cloſed together, no further motion of the inſtrument ſeems neceſſary, nor indeed can be conveniently effected to any conſiderable degree.

When the opening is thus made through the urethra, and conſequently the point of the ſhort ſtaff fixed in the groove of the long ſtaff, the two ſtaves are to be held firmly together by the operator's left hand, and nothing remains but to apply the beak of the gorget to the groove of the ſhort ſtaff, and to puſh it on till it be received in the groove of the long ſtaff; and if the ſtaff be made with a contracted groove, it will enter juſt where the contraction begins, and thus *muſt*

be

be ſafely conducted into the bladder. This being accompliſhed, the ſtaves are to be withdrawn, and the gorget continuing in the bladder, the operation is to be finiſhed in the uſual way. With regard to the remainder of the operation, every circumſtance which appeared to me important in the performance of it, I have endeavoured fully to detail and elucidate in my treatiſe on that ſubject, ſo that it is unneceſſary for me to make any obſervations on it in this place.

Such is the inſtrument which I have been ſedulous to contrive from conviction that ſome method was wanting to obviate the difficulties and inconveniences which have been mentioned; I hope it will be found to anſwer the intended purpoſe, and that by theſe means the moſt obſcure and diſtreſſing part of the operation may be performed with equal facility as any other part of it, and the operation in general rendered leſs painful, and more ſafe and expeditious.

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It has been obſerved, on various occaſions, that one right meaſure being adopted, it often happens that many good conſequences, at firſt perhaps not obvious, are derived from it. Thus it appears to me, and I ſhall endeavour to ſhew, that from the method of performing the operation of lithotomy, which I have deſcribed, ſeveral important advantages, unthought of at the time of inventing the inſtrument, will be obtained. Theſe I ſhall endeavour to point out in order as they would occur in performing the operation.

Happily for mankind the ſtone in the urinary bladder is not ſo common as many more tolerable evils to which the human frame is ſubject, conſequently lithotomy, not frequently occurring, cannot be ſo familiar as many other operations; for which reaſons, and alſo on account of the different ſize and ſhape of the parts in different ſubjects, it happens that at the commencement of the operation a doubt or un-

certainty

certainty ſometimes ariſes where to begin the external inciſion, and how far to extend it. In the uſual operation the firſt object of the external inciſion is to give room for the introduction of the gorget and the expanſion of the forceps in bringing out the ſtone; but this muſt be made to correſpond with the ſecond inciſion, which is to make way down to that part of the urethra which covers the ſtaff where it is neceſſary to be expoſed for the reception of the gorget, and this in the common ſtaff is the part of the groove juſt above the curvature. When the ſtaff is in the urethra, either from the thickneſs of the parts which cover it, or from the difference in the lengths of different urethræ, or from the ſtaff having more or leſs entered the bladder, it certainly is not always an eaſy matter to determine the ſituation of this part of it; and the difficulty of aſcertaining this point is ſtill greater, and of more conſequence,

where

where the ſtaff with the contracted groove is uſed, as it is then neceſſary to fix on the preciſe part where the groove is dilated, and the contracted part begins, otherwiſe the beak of the gorget could not be introduced.

It will, I preſume, be perceived that this inſtrument, at once, effectually determines this important point, for ſo ſoon as the ſtaff is introduced through the urethra into the bladder, and the ſtone is felt, the ſhort ſtaff, being brought down over the ſcrotum, and made to touch lightly on the perineum, inſtantly ſhews where the contraction in the groove of the long ſtaff begins, and where the opening is to be made into the urethra, conſequently the operator will take it for his guide in making the external inciſion, and that he may have room to handle his inſtruments and bring out the ſtone, will begin his inciſion an inch, or as far as he judges proper, above the part to which the inſtru-

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ment points, and carry it down two inches, or so far as he thinks right, below it, toward the tuberosity of the ischium. The same observation will also be a sufficient direction in making the second incision.

After long experience of the operation of lithotomy, and repeated observations on the performance of it by others, I cannot but consider the ascertainment of the precise part where the incision is to be made, particularly when the staff with the contracted groove is employed, of very material consequence; indeed it appears to me so necessary a desideratum, that if this, which is but a secondary consideration, were the sole object attained by the instrument, I should not think my time had been misapplied in inventing it. But we will examine further, and I flatter myself that still greater advantages will be found derivable from it.

When the external incision is completed, the

the next confideration is what part of the urethra it is moft proper to divide in order to admit the gorget: I believe this will univerfally be allowed to be the membranous, as it is the thinneft, moft eafily dilatable, and leaft furnifhed with blood veffels. Now, however well fkilled in anatomy an operator may be, or however accuftomed to operate, it is not always in his power, when he is dividing the urethra with his biftory, to prevent the incifion from being made longer than neceffary, and alfo to avoid cutting into the bulb, which being a part of the urethra that does not readily admit of dilatation in the extraction of the ftone, and is moft commonly the feat of thofe troublefome hemorrages which fo often occur in the operation, ought not to be wounded. If the moft fkilful are fometimes not exempt from fuch accidents, how much more vague and uncertain muft the direction of the knife be in

in the hands of perſons not much accuſtomed to operate. Such practitioners, for ſuch there muſt be, I principally mean to aſſiſt, but I flatter myſelf that the inſtrument which has been deſcribed will not prove unacceptable nor unuſeful to the experienced and well informed, if it ſhall appear that it may be contrived and adapted to divide with certainty the membranous part of the urethra only; but in order righly to comprehend this effect of the inſtrument it ſhould be premiſed and obſerved, that in performing the operation with the ſtaff which is commonly uſed, it is intended that the operator ſhould, after the external inciſion is made, find with his finger the ſulcus into whieh he is to make his inciſion, and then by the guidance of his finger to introduce the beak of the gorget; this he would not be able to do unleſs the ſulcus was grooved higher than the curvature of the ſtaff; and in thoſe ſtaves in which the ſulcus

is contracted, the contraction actually begins above the curvature, for the same reason, viz. that the operator may readily find where he can safely lodge his gorget. The inevitable consequence of this is, that the incision is always made higher than is necessary, and the bulb of the urethra consequently can scarcely escape being wounded by the bistouri, and indeed is frequently divided by the gorget, which must pass downward, and then follow the curvature of the staff, before the hand of the operator can be lowered so as to bring the gorget to a straight line, in order for it to pass under the os pubis into the bladder. All this cutting above the curvature, I am persuaded, every judge of the operation will allow to be unnecessary, and, if possible, ought to be avoided. By the staff which is used with the instrument under our present consideration, this defect in the common operation is done away, as the groove into which

which the beak of the gorget is to enter, not being required to be examined by the finger, need not commence till juſt before the turn begins which conducts it under the os pubis, and as the opening is made in that part by the ſhort ſtaff, the gorget paſſes immediately into the membranous part of the urethra without injury to the bulb.

From the ſame circumſtance alſo it will be obſerved that another material advantage is gained, if it be recollected that the paſſage of the gorget round the curvature of the ſtaff was always conſidered the moſt difficult part of its introduction, and alſo the moſt hazardous, from the poſſibility of the force, required to preſs it downward, cauſing it to ſlip off at a right angle from the bottom of the curve. By uſing the inſtrument deſcribed this danger is avoided, as, the introduction of it being nearly ſtraight forward, there is no neceſſity for any downward preſ-

ſure; and by the ſame means the opening into the urethra being made in the part where the inciſion of it, which is made by the knife in the common operation, terminates, the operation on the male becomes nearly as ſimple as when it is performed on the female urethra. All which I ſhould imagine muſt be allowed to be conſiderable and manifeſt advantages.

On the whole I hope I have made it appear, that this inſtrument, which may be called the double ſtaff, firſt clearly points out the part where the external inciſions are to be made; thoſe being completed, it will pierce the urethra in the moſt proper part inſtantly and certainly, by which all vague and reiterated inciſions will be avoided.—It will render the paſſage of the gorget above the curvature of the ſtaff unneceſſary, direct it into the groove at the beginning of the curve, and then prove an unerring guide for it into the bladder.

der.—Taking all theſe circumſtances into conſideration, and recollecting the operation as it has been uſually performed, I truſt it will appear that the double ſtaff is adapted to ſhorten and improve the operation of lithotomy.

FINIS.